Presented to Dr H E Goodman
by the Author Dr Betton
upwards of 25 yrs ago
this day presented to
College of Physicians by
6.28.95 Harriet Goodman
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I will not apologise, Gentlemen, for introducing, at some length, to your notice, and recommending to your very serious study, the topic which will occupy our attention during many of the lectures constituting part of the course I shall have the honor to deliver to you. I am aware that they may appear dry and tedious, and wanting in the excitement and interest attending a subject more capable of demonstration, for they must necessarily be entirely didactic, and addressed to your understanding and reflection alone. But, when you remember Gentlemen, that the phenomena and results of Inflammation, are of paramount importance in the Science of Surgery; that without it you would fail in the boldest and most brilliant operation you could perform, and that the most insignificant and simple, even Venesection itself, would prove fatal, without the aid of its salutary process, you will forgive my dwelling on it, and lose sight of its tediousness, in the importance of its effects.

It may be not uninteresting to

cast a glimpse, over what may be called the comparative history of Infl. as such an examination will exhibit most clearly the influence of the ganglionic-nervous system in the production of the phenomena of this morbid action.

There is no reason for believing that a process of the same nature as Infl. exists under any circumstances in the vegetable kingdom. When plants are injured, or have a part of their substance destroyed, there is no new process of separation set up, but the vacancy is filled by the regular and natural growth of the vegetable body. Thus when the wood of a tree is laid bare, by an accidental injury, it is covered in by the annual deposit of the cambium or organizing substance, which is shed at the same time, and in the same manner, from the inner layer of the bark, as on every other part of the tree. The formation of galls and other excrescences on the leaves of plants, produced by the punctures for the insertion of the ova of insects, bears some resemblance to the effects of Infl. in animals; it is, however, only an exuberant growth.

Animals that have no visible

nerves, and those in which the nervous system is very simple, exhibit none of the phenomena of Infl. In polypi and other gemmiparous animals, incision and division instead of acting as an injury, constitute one of the means for multiplying the species, in the same manner as the slips and cuttings of plants serve for propagation. The gray and green polyps have been united together, it is said by Blumenbach, so as to constitute one animal. This operation is similar to the incorporation of different kinds of plants by the process of engrafting.

When worms are cut into two portions, the divided surfaces assume the disposition to heal, from the moment the injury is inflicted. The edges of the wound approximate each other, and remain in close contact until they are perfectly healed, after which they recede to restore the tubular form of the animal. The healing is a very brief process. In this class of animals we observe some very remarkable instances of reparative power. Many may be divided into several pieces, each section forming a new individual. Dugès divided one of the planaria longitudinally, thro' the head

and anterior part of the body, and each division developed a perfect head. If the common earthworm be divided into two parts, each, it is asserted, will become a perfect individual.

It does not appear that insects are susceptible of Inft. after injuries. It is not known in what manner the poison generated by certain species of insects, affects others of the same class: but it is quite certain that it does not cause Inft: as in quadrupeds and the human subject. When the spider inflicts a wound on a fly, it is usually instantaneously fatal: but when a sufficient quantity of the poison is not inserted into the wound, it stupifies the insect, producing the effect of a vegetable narcotic poison. In this class of animals we meet with some curious examples of the reproduction of parts of the body. Thus, if a crab or lobster have one of its limbs torn off, the broken surface speedily heals without any appearance of Inft. after which a new limb is usually seen to sprout out, commencing as a bud or germ, and proceeding to grow, until it acquires the shape, magnitude and structure of the original member.

Heinecken states that, the Arachnida, when young, can reproduce their legs, but lose that power when fully developed. The age of insects seems to have great influence over their reproductive power. When the antennæ are removed in the larvæ, they grow again, but not in the perfect insect.

The class mollusca does not seem to be capable of genuine Repl. In some of the testaceous mollusca as the oyster and muscle, we find that some parts of the body may die and putrify, yet remain in connexion with the rest, and apparently not affect it. The presence of an extraneous body will produce an exuberant growth of the shell. The production of pearls is usually the effect of the presence of a small worm which lies behind the membrane that lines and secretes the shell, and probably deposits its ova there. A pearly formation may also be induced by a wound of the membrane of the shell, and by placing a piece of wire in the hole. In short the presence of any extraneous matter, causes a greater flow of the juice of which the shell is composed, and thus the growth of pearls is precisely similar to the excrescence of plants, caused

by the gall insect. The reproductive power of some mollusca is very considerable, the head of the snail may be cut off, and provided the ganglion which lies above the oesophagus, and which is analogous to the brain, has not been injured, the loss is repaired by a new growth. It is said, that this experiment will not succeed in a cold temperature.

In neither of the two classes of vertebrate animals with cold blood, says a modern author, do I believe it possible to produce the genuine effects of inflam. In conducting some experiments on the swimming bladder of fishes, I was surprised to find that the wounds made into the belly of the animals did not inflame. I was therefore curious to know what injuries fishes would bear without producing inflam. Having taken some living fishes from the water, I introduced pieces of wire beneath the skin and amongst the muscles of the body: the fishes were then returned to the water, and on examining them several days afterward, I found that no suppuration had taken place. The tracks of the wounds were pale and smooth, and only moistened

with a serous fluid, presenting none of the usual appearances of Inft. A very common occurrence in fishes, is the existence of worms, which perforate the tunics of the alimentary canal, without producing any change of structure, excepting an increased vascularity around the perforations. The productive power of fishes is confined to their fins which are sometimes regenerated after being lost by accident, or by a species of death, which is quite different from that which is the consequence of Inft. in the higher class of animals.

Appearances of Inft. are never seen in reptiles after wounds or injuries. Serpents often lose a portion of their tail: and altho' there is no attempt made for its reproduction, it is very speedily cicatrized without Inft. Some lizards are able to reproduce parts that are lost, tho' not so perfectly as in the lower orders of animals. The Salamander has more power of reproduction than any other of the class, being capable according to some physiologists of regenerating the tail, the limbs, and the lower jaw. I have seen imperfect attempts at the reproduction of the fingers and toes in the toad

and frog. In all this class of animals there is great tenacity of life, and power of repairing the effects of injuries, tho' not always the ability of regenerating limbs.

In the class of birds we first discover the existence of genuine Inft. as the consequence of external mechanical injury: but the instances in which internal disorders become a cause of Inft. are very limited, and are nearly confined to febrile states and particular epidemics.

Quadrupeds are subject to Inft. both from external injuries and internal disorders; they usually, however, show but little constitutional sympathy with local affection. A horse or a dog will continue to eat, tho' suffering from a disease or an accident that may prove fatal.

The human being, above all others, is disposed to Inft. sometimes in consequence of the slightest external irritation, and of various internal disorders. The nervous system of the human subject is so complicated, that there is hardly a local affection with which the constitution does not sympathize, nor any constitutional disturbance which may not become the cause

of local disease. The same susceptibility, however, communicates a power to the means we employ for preventing or abating inflammation, which does not belong to animals of an inferior organization; and when by those means we are enabled to remove the cause of injury sustained, or produce a state of sensibility inconsistent with inf. the reparative processes go on in much the same manner as in animals endowed with an inferior degree of feeling.

Inflammation (called also Phlegmon, Phlogosis, Inflammatio) may be defined; a perverted condition of the blood, and bloodvessels of a part, interrupting its healthy function, and changing its normal structure, ordinarily attended with pain, redness, heat and swelling, and including more or less disturbance of the general system.

The term inf. has been objected to by some writers on Surgery, amongst others by Mr. Miller, who would restrict its application to what is essentially morbid, in contradistinction to Mr. Hunter, who divided it into healthy and unhealthy: the former consisting probably of only one kind

not being divisible but into its different stages, and is that which will always attend a healthy constitution or part, is rather to be considered as a restorative action than a diseased one, and would appear to be rather the effect of a stimulus than an irritation. The unhealthy admits of vast variety, and is that which always attends an unhealthy constitution or part, but principally according to the Constitution.

Andral in his "Précis d'Anatomie Pathologique" says "When the increase of normal excitability or irritation is accompanied by redness, pain and heating, it has been called Inflammation. Created in the infancy of science, this purely metaphorical expression, was intended to represent a morbid state, in which the parts seemed to burn, to inflame, as if subjected to the action of fire. Received into common parlance without any precise idea ever having been attached to it, under the triple relations of the symptoms which announce it, the lesions which characterize it, and its ultimate nature; the expression Inf. has become vague, its interpretation so arbitrary that it has really become valueless. It resembles

an old piece of money, from which the impression has been obliterated, and which should be withdrawn from circulation, as it gives rise only to error and confusion. Infl. can no longer be considered but as the expression of a complex phenomenon, comprising several other phenomena, of which the dependence is neither necessary nor constant. I shall therefore designate under the term hyperæmia, the increase of the quantity of blood, or in other words, its congestion, without regard to the cause from which it may arise.

All organs of the body may become infl. except the cuticle, hair, and nails. This disposition to become infl. depends on the number of nerves and capillaries in a part. The actual seat of Infl. is always the capillary vascular system, and the ganglionic nervous system accompanying the most delicate branches of the vessels, and which specially presides over vegetation in the organism. Inflam. says Hunter, when the constitution is strong will be commonly the most manageable, for strength lessens irritability; but in every kind of constitution Infl. will be the most manageable when the

power and action are pretty well proportioned: but as every part of the body has not equal strength, then proportions cannot be the same in every part of the same constitution. According to this idea of strength, the following parts, viz: muscles, cellular membrane and skin, and more so in proportion as they are nearer the centre of circulation, will be more manageable in Inflm and its consequences, because they are stronger in their powers of action than the other parts of the body. The other parts as bone tendon ligament etc, fall into an Inflm which it is less in the power of art to manage, because tho' the constitution is good, yet they have less power within themselves, and therefore are attended with a feeling of their own weakness: if in vital parts the Inflm will be less manageable, for tho' the parts themselves may have pretty strong powers, yet the constitution and natural operations of universal health become so much affected that no salutary effect can so readily take place.

We will now proceed to investigate some of the theories which have been invented respecting the <u>proximate cause</u> or <u>essential</u>

nature of Rufl. Of the older writers some attributed it to a lentor or viscidity of the blood. — others to an error loci, that is an obstruction of the capillaries by the entrance of globules too large to pass thro' them. Cullen supposed that it consisted in a spasm of the extreme vessels. Hunter ascribed it to an increased action. Watson Philip and Hastings to a debility — Henlé to a paralysis — and Mr. J. W. Earle to an obstruction of the capillaries

In assenting to these theories it was of course taken for granted that the capillaries are the essential seat of Rufl. and that it is to some action or condition of them that the phenomena of Rufl. are due: but Dr. Macartney has shown clearly that it could not be the bloodvessels which were the parts originally affected: and has proposed a theory, which, if I may be allowed an opinion, appears to be more nearly correct than any of the preceding, that a sense of injury felt by the organic nerves, is the punctum saliens or starting point of Rufl: a theory valuable likewise in its practical results, since it is very certain that Rufl after an injury may be mitigated

or prevented by measures calculated to soothe and allay the sense of irritation.

The next step arrived at, was the conviction, as stated by Mr. Travers, that Inft. was not a disorder in any one element of the tissues alone: neither in the blood, bloodvessels, nerves or lymphatics, nor yet that it was a change purely chemical physical, or nervous: but that the tissues are involved as a living whole, and alter their properties simultaneously.

So Liebig's theory, that in Inft. there is an unnaturally rapid oxydation of the Inft. tissues, is no doubt true, altho' not the whole truth.

Now, says Mr. Dewitt, if we consider for a moment, the relation which the living tissues and the bloodvessels have to each other in health, we shall acquire a more just idea of the share they take respectively in Inft. The bloodvessels are but carriers, the arteries bring oxygen to excite the different functions and to dissolve and destroy tissues which have played their part, and are become effete: they also bring new material, which the tissues at least out of the capillaries, and employ by

means of their vital forces, for their own reparation and increase: and the veins carry away effete and superfluous matters. But they do no more: they are not, as it has been the custom to term them, the agents of organization, the builders of tissues: for in the foetus much of the organization is accomplished before bloodvessels are formed at all: and there are many tissues in the adult, such as the cornea, which have no vessels, but nourish themselves out of the fluids exuding from the vessels in their vicinity.

Wherever in health, the vital forces are most active, there most blood is conveyed. When the womb or breasts enlarge in pregnancy, their vessels become infinitely more voluminous: but the enlargement of the womb is not the consequence of the dilatation of the bloodvessels, but the cause of it: more blood is demanded there, more blood is brought, and the arteries enlarge in obedience to the wants of the part they supply.

If we apply these views to explain the essential nature of puff, we shall be compelled to admit that its seat is not mere vessel or nerve, but the living tissue, the

organic cell. That the tissue which in its normal condition, attracts out of the neighbouring bloodvessels, the necessary materials for its life and growth, if its vitality be interfered with — by injury, by poison, by heat or cold, or any other source of disease — sets up another series of actions of which the attraction of considerable quantities of arterial blood is one of the most conspicuous, and which in their totality constitute Inflam.

That, under favorable circumstances, if for instance there is a physical breach of continuity to be repaired, the tissue attracts from the vessels some of the liquor sanguinis, which forms a blastema, or plastic material in which new organic cells are developed, and become a living tissue by which the injury is repaired. The adhesion of a wound, and the reparation of a simple fracture are familiar examples.

That, under less favorable circumstances, arising from the amount of injury inflicted, or from the want of proper vital power in the cell, or from a defective state of the liquor sanguinis, a series of further changes ensues.

The plasma attracted from the bloodvessels, begets within itself a kind of cell, incapable of further life and development—which is well known as the pus-corpuscle.

That, under these more unfavorable circumstances, the tissues, after a violent struggle, perish and mortify.

That, under certain unhealthy conditions, the liquor sanguinis, whether that supplied for the common purposes of nutrition, or that supplied in greater quantity thro' a slight degree of Inft. begets its various morbid cells, such as those of cancer, tubercle, etc.

We are thus compelled to take from the capillaries the office that has been so long assigned to them, as the factors of Inft. But yet the great afflux of arterial blood is a most important instrument in the changes which Inft. produces, and the prevention of it is one of the most efficient means for controlling those changes. And there is little doubt but that the lax state of the bloodvessels in a chronically Inft. part is often one great obstacle to a perfect recovery.

We are further compelled to deny the various theories which take a distended state of the capillaries as their basis, and account for the various effects of Inf. as so many mechanical consequences of that distention. Thus it has been common to say, that serum exudes from the bloodvessels in the first stage, when but slightly distended; that, under the influence of greater distention, the liquor sanguinis is forced out; that if the Inf. still progress, blood will be extravasated.

But, granting that when the vessels are much distended, serum will exude from them, and that if they are further distended, they may be ruptured and give exit to blood, yet this theory is quite insufficient to account for the effusion of liquor sanguinis or of lymph. In Inf. of serous membranes for instance, "the bloodvessels are all on one side of the membrane, and yet the serum and lymph are on the other." If the lymph were merely effused mechanically from distended capillaries, it ought to be found when the capillaries are in the sub-serous-cellular tissue; its being found where it is, can be accounted for only on the theory

we have been labouring to prove: viz that it is attracted out of the capillaries by the cells on the free surface of the serous membrane.

From health to true inf. is not one step, at once attained, but a transition gradually effected, the time occupied varying according to circumstances. In some cases a very few hours suffice; in others days shall have elapsed, and yet the process be incomplete.

This transition may be conveniently divided into three stages, viz
I. Simple Vascular Excitement
II. Active Congestion
III. True Inflammation.

Let us take a common surgical example; the application of some acid substance to the skin.

Each component texture of the part may be affected, as soon as brought

in contact with the irritant; yet it is not impossible that one texture may be involved sooner and more seriously than the other. The one is the nervous, and hence immediate pain, by its effect on its sensory portion. An impression is then conveyed from the heart to the nervous centre: thence follows, by reflex action, a stimulus to the vascular tissue of the part, already roused by the direct action of the irritant, and that stimulus is in due time obeyed: as if both part and system resented the injury and had resolved to resist or repair the evil, by a functional effort, the greater share in which falls to be borne by the blood vessels.

Mr. Wharton Jones ingeniously supposes that the irritatory effect on the nerves of the part is double: first, on the sensory nerves: secondarily on those of motion, producing excitement of the former, depression of the latter. That the exciting cause, acts primarily on the sensitive nerves, exalting their activity. The motor nerves of the vessels, which have sympathetical relations with the excited sensitive nerves are secondarily affected. But this affection of the motor nerves

of the vessels, which supervenes by reflex action on the excitement of the sensitive nerves, is not a corresponding state of excitement, but an opposite one of depression, of suspension of action, or paralysis.

The time which elapses between the application of the exciting cause, and the establishment of the vascular action thereby induced, is termed the period of Incubation: varying as to its duration, in some cases very brief, in others protracted, always valuable in regard to treatment.

The action commences with determination of blood to the part, an unusual amount of that fluid reaches it, and is sent thro' it with augmented velocity. At first the capillaries and minute arteries are of diminished calibre: a change resulting from the inherent contraction of their walls, or from a contraction of the parenchyma, or most probably from both causes. But soon this spasm or increase of tone in their coats passes off, they gradually yield before the increased and increasing flow, which yet the rapidity of this is by no means diminished. After a short time the spasm has not only disappeared

and the wonted capacity regained, but dilatation beyond the normal standard is begun. Capillaries which previously contained but single files of the red corpuscles, now admit of them rolling thro' in masses; consequently, vessels, formerly invisible, are now seen plainly; and the accelerated motion of the general current is yet unabated. In such a state of things, it need afford no surprise to find a tendency to unusual transudation: in other words, along with an increased circulation, comes an increase of the ordinary function of the circulation. The blood parts with a portion of its contents more liberally than in quiet health. The transudation may at first be chiefly serous; but if such action be sustained for some time, the liquor sanguinis is found in the interstitial spaces. The natural function of the part is exalted: if this be secretion, the secreted fluid is increased in quantity; yet with its normal characters scarcely, if at all changed. Nutrition is exalted, and the fibro-cellular tissue is fuller than before, giving slight increase of bulk. Thus is constituted the first stage, Simple

Vascular Excitement, not inconsistent with health, but rather its mere exaltation, synonymous with the Vital Turgescence of some physiologists. The part contains an increased amount of blood: its circulation is unusually active: and there is a marked tendency to increased exudation, partly of a serous, and partly of a plastic kind.

The exciting cause being removed, the action may soon subside, and the part regain quiescence: or the exciting cause remaining, the action is sustained, yet without proceeding to a higher grade, and a salutary result is probably secured thereby. For instance, it is by the continuance of such simple action, that the conjunctiva resents the presence of a grain of sand, and often succeeds in washing it away by the increased effusion. But, the exciting cause remaining, or being severe, in its nature, tho' of brief application, there is neither abatement nor simple maintenance of the action, but advance, and this brings us to the second stage, in which,

The vascular commotion extends on the cardiac side of the affected part,

the arterial trunks feeding it, have partaken in the excitement, have begun to enlarge, and are pulsating with unwonted energy. More and more blood is sent down to the part, and the capillaries and minute arteries, begin to give way beneath their burden; they were, hitherto, simply dilated, retaining their tone and controlling the circulation of their contents: but now enlargement is about to be merged in overdistention the vascular walls gradually parting with their tone. And partly from this cause, partly on account of change in the blood itself, which seems more viscid, with its corpuscles less distinct, and when examined by the microscope is found especially to possess an increased number of "colorless lymph globules" unusually adhesive to each other, and to the walls of the vessels, and so manifestly operating obstructively — and partly also, it is probable, from an increase of vital attraction between the blood and surrounding parenchyma — the circulation loses its acquired rapidity, and becomes slower even than in health. The red corpuscles are no longer limited to the central current, but are encroaching more and more on the lateral

and clear "lymph spaces." Exudation is more copious than in the preceding stage: it consists of serum and liquor sanguinis, the latter usually predominating: and when the action has been for some time sustained, and, as it were established in the part, fibrin alone may be deposited. The fibrin of the blood is increased, not only in quantity, but also in plasticity or tendency to become organized. The natural function of the part is not simply exalted, but begins to be perverted; for example, secretion is not only increased, but changed in its character. By the fibrinous interstitial deposit the texture of the part is softened and enlarged. The "formative power" as it is termed of the part is impaired or overborne; the supply of plastic material is greater than can be usefully and normally applied by the implicated tissues. Nutrition, or the normal and vital relation which subsists between the living tissues and nutrient materials contained in the blood, is becoming more and more disturbed: and this, perhaps constitutes the most important part of the inflam. process, leading ultimately to change of structure more or less permanent, and more or less inimical to the

sumption or continuance of normal function.

This is constituted Active Congestion; the arterial tension is increased, the amount of blood in the part still further augmented: its vessels beginning to be over-distended, and losing tone thereby; its circulation becoming slow: its blood undergoing change, the fibrin especially being increased, both in quantity and plasticity; function and nutrition perverted. This action may resolve after the removal of its simple exciting cause: or it may be sustained for some time, as in the healing of Wounds, and the closing of Ulcers, or it may advance to the third stage, in which is completed the change which, in the preceding stage, had begun in the blood. The overdistention of the capillaries is established, the capillary power is for a time gone — perhaps in consequence of diminution or actual suspension of the nervous influence, and the coats of the capillaries and other vessels are thickened, softened and impaired in cohesion, being themselves the subjects of structural change. The languor of circulation approaches stagnation, and at some points this has actually occurred: every part of the distended

capillaries is occupied by crowded, colorless and colored corpuscles: partly it may be from increased attraction between the former and the surrounding parenchyma, partly by accumulation and adhesion of the latter to each and to the capillary walls. The altered liquor sanguinis is expelled in profusion; the capillaries also give way in their coats, and from the lesion blood is effused in mass. Suppuration is in progress by extravascular degeneration of the fibrinous effusion, or else by a secretive elaboration of it ere yet it has left the vessel. Breaking up, and disintegration of texture ensued, according to the extent of extravasation and suppuration; and the disintegrated texture is commingled with the effusion. The formative power has ceased, and the opposite condition, a tendency to disintegration from diminution of vitality has become established. Disorder of function is complete, secretion, for example, being in the first place arrested, and when restored, more vitiated than before.

Whilst in the circulation of the part truly inflamed, all is sluggishness and stagnation, that of the parts around is unusually active. The arterial trunks in the vicinity

continue to play with increased energy: more blood continues to be sent: but cannot now be transmitted in its direct course; in the inflamed part it meets an obstruction, and being sent round another way, throws a greater stress on the collateral vessels: these retain vigour sufficient for the augmented labour, and send the current rapidly round. But, in their turn, they themselves may be overborne by an extension of the disease and the active route, rendered, at each extension, more and more circuitous.

While the apparatus of deposit is thus unusually busy, that of absorption is in abeyance. During Inf. the lymphatics and minute veins do little or nothing as absorbents. But on the yielding of the action, not only does effusion begin to abate, but besides, absorption comes again into play, and that actively; and then, the part is often restored nearly or altogether to its original state. During Inf. of a serous membrane for example, a large amount of liquid effusion often rapidly accumulates within its cavity: so long as the action persists, that fluid either remains stationary or receives an increase, but so soon as the

inflam. process has given way, and resolution is in progress, the effusion plainly diminishes, almost pari passu: and in a few days, or perhaps in but a few hours, it may have wholly disappeared.

The inflam. change of the blood is important; 1st the liquor sanguinis is increased in relative quantity, and its serum is said to contain an unusual amount of albumen. IId. The fibrin is increased in quantity both actually and relatively to the red corpuscles, the vital attraction between its component particles, tending to aggregation is also augmented. During Active Congestion, its plasticity was increased, but now it becomes more and more aplastic. The proportion of serum is diminished, probably in consequence of effusion. IIId. The red corpuscles are relatively diminished in number, and their tendency to aggregation is augmented. IVth. The colorless or "lymph globules" are greatly more numerous; but whether by new formation, or by mere accumulation in the part, has not yet been determined. They incline not only to aggregate, but also to adhere to the sides of the vessels: thus increasing, or according to Lane, causing the

tendency to stagnation of the blood. This alteration of the blood begun in the second, and completed in the third or true inflam. stage, is at first a local act, effected in the part inflamed: but this laboratory, if continued thus in operation, ultimately involves the whole circulating fluid in similar change.

Such is Inflam. Proper. Blood much altered, stagnant or tending to stagnation. The capillaries over distended passive tubes: their coats, thick, soft, and lacerable. The neighbouring circulation collateral, unusually active. Exudation of liquor sanguinis whole fibrin is becoming more and more aplastic: extravasation, by lesion, of blood. Nutrition and function wholly perverted. Structure changed, texture softened and enlarged. Suppuration in progress, and part of the texture breaking up. Nothing healthy, or consistent with local health, all essentially disease.

This state is not at once established, as soon as the period of incubation has passed away; but, as already stated, is approached by a process of transition more or less gradual. The previous stages may be either short or protracted, but can, in no case, be proved absent. When the process is somewhat tardy

its compound nature is more distinct. Take for illustration the vaccine pustule: an Inf. resulting from a poisoned wound, and gradually attaining to its consummation. The exciting cause is applied, and for a time seems to be inoperative: three days commonly elapse without the appearance of vascular excitement, and this is the period of incubation; on the 4th day the papular condition is established: commencing with simple excitement, and steadily verging toward active congestion. During the following days the vesicle is formed, the result of the increasing second stage of action, the vesicle at first containing mere serum, but afterward becoming of a more glutinous character by the exudation of the liquor sanguinis. On the 9th day the pustular formation is attained, and not until then has the establishment of True Inf. been completed. Soon thereafter the vascular action ordinarily subsides, and the part slowly recovers.

It has often been disputed whether Inf. is the result of an increase or diminution of vital strength in the part — an excitement or a debility: and both extremes have been tenaciously held and argued.

According to the preceding account, the fact lies midway between the disputants: the action being found to commence with excitement, and probably an actual exaltation of the parts' vitality: this, however, proving usually of short duration, and succeeded by growing debility, and much ultimate prostration. In fact, established, vital power is but very low, and what is worse, from this overthrow, the part, once truly inflamed never altogether recovers, but ever remains both more prone to action, and less able to control it, a fact which it is of much importance that both patient, and practitioner should bear in remembrance.

I have thus, Gentlemen, endeavoured to give you a sketch, slight tho' it may be, of the most prominent theories that have been advanced and supported concerning this most interesting and all important subject. They have been, as you see, various and opposite, and each, in its turn, has been strenuously defended, and as vigorously opposed by friend and foe, and you may, indeed, with great reason, feel embarrassed as to which you may deem worthy of your support. This selection, I must leave to your own

judgment, after duly investigating the relative merits of them all: with this single remark, that my own conviction inclines me to the theory of the location of Inf. in the capillaries, the ganglionic nervous system being the starting point whence emanates the morbid influence giving rise to the phenomena characterising the condition of parts designated by the word Inf. which like Fever, should be considered, only in a general, and not in a specific sense.

From this topic we pass, by a very natural transition, to the consideration of some of the causes of the local symptoms which are pain, redness, heat, swelling throbbing, increased sensibility, disorder of function; arrest and change of secretion.

The pain depends on the increased activity of the nerves, and this again produces the succeeding increased influx of blood, and the vital expansion of the vessels; afterwards the pain is increased, by the decided expansion and tension which the parts suffers. It differs according to the degree of Inf. and the sensibility of the affected part: Often it consists only in the sensation of prickling, itching, tickling and a troublesome

stretching. Often it is stabbing, tearing, burning, and in structures largely supplied with nerves it attains a most vehement degree.

This increased action of the nerves is owing to the squeezing and stretching of the minute nerves of the part, by the increased size of the capillary vessels, resulting from the obstruction of the current of blood thro' them, which occurs at the very onset, and which is the first step of the inft. process.

Mr. Travers, corroborated by John Hunter considers the pain of Inft. ~~[illegible]~~ connected directly or indirectly with the state of the bloodvessels, and says, that probably the nerves of the bloodvessels (nervi vasorum) are the first excited in the pain of Inft. Throbbing, generally supposed to mark the occurrence of suppuration is not always an unerring guide, for it is, according to Mr. Travers, the most characteristic distinction of acute Inft, and he also points out that the description of pain unattended by Inft. differs from the pain of Inft. altho' the former is subject to variations, in kind, duration, and intensity.

Neuralgia is generally attended with more or less muscular cramp or spasm, and such pain is either intermitting or periodical, and such remedies as relieve pain in the absence of Inflm. have little or no beneficial effect on the pain of Inft. Bloodletting aggravates neuralgia and relieves Infl. Steel, arsenic and quinine aggravate Infl. and cure Neuralgia.

Many parts of the body in a natural state, give peculiar sensations when impressed; when they are injured they likewise give pain peculiar to themselves, of which you have an example in the squeezing and Inflm. of the testicle. And the same mode of impression shall give a peculiar sensation to one part, while it shall give pain in another, thus what will produce sickness in the stomach, will produce pain in the colon.

Travers makes a remark, showing that pain is not necessarily an attendant on Infl. which is well worth remembering, and with which few careful observers will not agree. "We are told" says he "that there can be no Inft. where there is no pain. I

reply, that there are many, and destructive too, a joint, an eye, nay the lungs may be destroyed by hyp., without pain: he is a speculative, not a practical pathologist, who does not know this. It would be very easy to superinduce pain, in either of these cases, but, let there be no interference, and the work of destruction in numberless cases, is as silent, as it is sure.

Pain is not always inflammatory. It may be the attendant on spasms, or on simple irritation. The pain of spasm is intensely violent from its very outset; and tho' often abating, more or less, during its stay, seldom advances to a higher degree than that with which it began. The pain of hyp., on the contrary, usually commences with a slight amount, and steadily advances, hourly increasing, until either the action is subdued, or the part has perished by gangrene. Pain of spasm is often relieved by pressure, at all events, it is not aggravated thereby. In hyp. pressure even slight is quite intolerable. In colic, a man is gratified by a weight on his belly: in peritonitis, the slightest touch, is torture.

The pain of neuralgia remits, and sometimes intermits wholly during a longer or shorter period: that of inft. may remit, but is never intermittent. It may disappear suddenly, but if so, is not likely to return — the part having, in all probability, ceased to be amenable to further change.

The characteristics of Inft. pain, then are; it usually commences in a comparatively slight form, and steadily increases: it is constant, until the action resolves, or the part die; and it is invariably aggravated by pressure.

Sudden disappearance of Inft. pain is always fraught with suspicion, it is inconsistent with its ordinary character, and is always to be regarded with alarm. On its abrupt cessation, we do not dream of a mere remission of its cause, but suspect, and too often with truth, that the part is no longer capable of sensation, and has lapsed into gangrene. For example a portion of bowel is inft. connected with hernial protrusion or not; the pain is excruciating, on a sudden it ceases, the patient gratefully expresses his relief, and thinks he is better, perhaps safe: the surgeon, on the contrary, is alarmed, he looks

to the pulse, the surface, and the face he finds them feeble, cold, clammy and collapsed. The part has mortified.

In hyp. pain is sometimes absent, or, as it were, latent: an acute abscess may have formed in a limb previously paralytic, deprived of sensation as well as motion, and the patients' attention may have been scarcely attracted to the part by the perception of aught unusual. Or an injury of a limb has been accompanied by affection of the brain, inducing coma, perhaps long continued: in the limb hyp. inflammation may be advancing destructively, yet pain is neither felt nor evinced by the patient. In such cases the surgeon has to feel for his patient, and in the absence of pain to be unusually attentive to the other symptoms of local disease.

The pain may be sometimes termed sympathetic, referred to a part at a distance from that in which the hyp. resides. Such a part is either connected intimately by function with the other: or it contains the terminal expansion of nerves whose trunks pass thro' or near the hyp. Thus we may have suppuration in the hip-joint causing

infinitely less pain in that articulation, than in the region of the knee; abscess of the liver producing pain in the shoulder; inf. of the kidney producing pain at the orifice of the urethra. It is of the utmost importance that the practitioner should bear this in recollection: otherwise he may bring discredit to himself, and injury to the patient, by leeching the knee, instead of the hip; rubbing the shoulder, instead of attacking the liver; looking for the appearance of a gonorrhoea, instead of opposing a renal malady which may soon bring life into danger.

Pain is of itself a formidable thing: if intense and constant, certain to exhaust the powers of life, and consequently in many inflam. it must be overcome at whatever cost. When the part inflamed is an internal organ, intimately connected with the ganglionic system, the pain is of a peculiarly distressing nature, and highly dangerous by continuance. But, ordinarily the attendance of pain or inf., unless severe, may be viewed as of a salutary tendency. Were the action painless, practitioners and

patient might be unaware of its existence or extent, until too late to save texture, function, or even life.

When Inf. is the result of direct application of an exciting cause, as wounds heat or acid substances, pain usually precedes the vascular action. This may continue more or less, and be merged in the inflammatory: or may soon cease, leaving the greater portion of the period of incubation comparatively free. Such pain is also not without its uses, leading to precautionary and preventive measures — often infinitely more valuable than the curative.

The redness, says Mr. Hunter, is of various hues, according to the nature of the Inf. if healthy, it is of a pale red: if less healthy, the color will be darker, more of a purple and so on, till it shall be a thick purple; it is gradually lost in the surrounding parts if the Inf. is of the healthy kind: but in many others, it has a determined edge, as in the true erysipelatous, and some specific diseases, as the small pox. This increase of red appears to arise from two causes: the first is a dilatation of the vessels, whereby a greater quantity of blood

is allowed to pass into those vessels which only admitted lymph or serum before: the second is owing probably to new vessels being set up in the extravasated uniting coagulating lymph.

Mr. Travers thinks that the intensity of the redness depends on the degree of fulness (of the vessels) compatible with motion: for altho' the oxygen of the atmosphere redden the blood in the congested vessels of the surface, while circulation, however imperfect, continues, from the commencement of the state of absolute stagnation, the color gradually undergoes a change from pink to purple. In some modes of Inf. this shade of color even prevails from the beginning, and soon turns to livid. These varieties are due to the state of the general circulation which gives its character to the Inf. and an altering change in the constitution of the blood.

The more fully a part is injected with blood, the redder is its hue. An inflamed texture has its amount of blood very much increased: its color is necessarily heightened thereby. And not only are the vessels unusually gorged with blood, that blood is unusually red;

much of the liquor sanguinis having moved on from the field of actual or threatened stagnation, leaving the over-distended vessels filled chiefly with an agglomeration of red corpuscles. The cause of redness then is obvious.

The extreme vascularity of certain parts when inflamed, the conjunctiva for example, has been supposed to depend in part on the formation of new vessels, a result of the action. This may ultimately be the case; but it is not so in the first instance: Minute capillaries, in health carrying the red corpuscles in but single files, are invisible to the unassisted eye; inflamed, they are dilated, burdened with corpuscles in mass, and plainly seen; appearing to have grown up suddenly by a new creation, but being in truth only an enlargement of structure previously existing. The formation of new bloodvessels in fibrinous deposit, is a gradual and never an immediate process. Such ultimate vascularization is a frequent result or attendant on Infl. but it is incompatible and cannot be coexistent with the true inflammatory crisis, which is adverse to all formation of tissue, and is

suppurative and destructive.

The degree of redness varies according to the intensity of the action, and the previous vascularity of the part: or, in other words, according to the extent of the vascular engorgement, and the number of vessels which are engorged. It is a familiar test of the violence or forwardness of the disease, to look to the amount of redness. And we find inflamed tendon less florid than infl. skin; infl. skin less red than inflamed mucous membrane.

The tint varies, according to the character and accompaniments of the action; a bright arterial red is exhibited by what is acute and sthenic: the chronic and asthenic is denoted by a dark, venous and purple hue: great attendant biliary derangement, giving a yellowish red, as in bilious erysipelas.

It is inferred also that during the inf. venosa of the blood, transudation takes place of the coloring matter from the red corpuscles to the plasma, and also from the general mass of blood thro' the vascular coats to the parenchyma: and that to the

extent of this occurrence, the variations in the tint of an inflaming part, may be, at least in some degree, ascribed.

The extent and form of redness vary; sometimes limited to but a spot, as in the pustule or phlegmon; sometimes occupying a large surface, as in erysipelas and the corresponding affection of the mucous surface. Sometimes in one unbroken sheet as in erysipelas; sometimes in lines or patches as in inflam. of the veins and of the lymphatics. Sometimes gradually lost by diffusion in the surrounding paleness, as in phlegmon; sometimes carrying an abrupt bright margin, as in erratic erythema.

The diagnostic character of inflam. redness is its permanency. Other redness may come and go, as in the blush of shame; or the glow of warmth: but that of inflam. is fixed. By the pressure of a finger it may be made to disappear momentarily, but the pale dimple is quickly filled up and colored as before: all trace of the touch almost instantly vanishes, like the passing of breath from a mirror. The patient may be bled to syncope and the general surface grow pale as marble;

but this will not yet blanch the infl: part; its redness remains until the action which caused it shall have passed away.

But it is not only that it has no flitting tendency; it must be conjoined with other symptoms. The crimson spot on the hectic cheek is fixed there, but there is neither pain nor swelling; it is not conjoined with other signs, it is not inflam.

The redness of parts which have been slightly inflamed not unfrequently disappears after death, so that it is difficult sometimes to discover the precise spot, which, during life had been the seat of inflam. An observation well worthy of your remembrance, as it may exert a powerful influence in cases of medical jurisprudence in which you may be called to give evidence.

Various terms have been used by writers to express the varieties, degrees, and appearances of redness. Thus 1st it is called ramiform, when seated in the small arteries and veins only, and not in the capillaries. 2d It is said to be capilliform when some of the capillaries are also distended. 3d It is uniform when all the capillaries are injected, as in erysipelas.

4th It is punctiform when occurring in minute dots; as when the villi of a mucous membrane are injected, but not the mucous tissue itself 5th It is called maculiform when the blood is either extremely accumulated, or else extravasated at certain points. This form of redness accompanies hemorrhagic inflammation.

After a number of observations and experiments Mr. Hunter came to the conclusion that a local inflam. does not increase the local heat above the natural heat of the animal. The experiments he made were 1st In the inflam. cavities of hydrocales, in which the thermometer stood at 98 3/4 F., an increase indeed of 6 3/4, on the natural heat ascertained prior to the inf. but as Hunter states, probably not equal to that of the blood at the source of circulation in the same man. 2d In a wound in a dog's chest, in which the heat before and after inf. was 101°. 3d In a wound in the pectoral muscles of an ass, 100° before, and varying from 99° to 101 1/2 after inf. 4th In the vagina of an ass from 99 1/2 as before the inf. to 100 1/2. In other experiments on mucous surfaces, the

heat was sometimes the same as before Infl. sometimes increased 1° or 2°.

But, as says Travers, the nerves measure the sensation rather than the degree of heat, and this is a widely different scale from Fahrenheit or Réaumur; the determination of blood to the capillaries in blushing is accompanied with a distinct tho' transient sensation of heat to the individual, yet not such as can be ascertained by the most delicate thermometer. It is most probably to be referred to the extraordinary inlet of arterial blood into the capillaries: its longer detention by the congestion proper to Inflam, and the consequent increase and vigor of the neighbouring circulation would give permanency to the sensation and render the actual increase of temperature appreciable.

The heat of Infl, therefore, is partly ac heat, partly the result of a perverted nervous function, estimated only by the patient.

Heat, like redness — and, as we have seen, both partly depend on the same cause — to be inflammatory must be permanent. Blushing brings heat as well as color, but both are evanescent; it is also conjoined with other symptoms of power

ted action, in hectic there is constant burning of the hands and feet, yet no inflam. is there.

In reference to the enlargement of the vessels of an infl. part, and its visible increased vascularity, Hunter observes "that instead of an increased attraction, there is what would rather appear an increased relaxation, of their muscular powers, being as we might suppose, left to their elasticity entirely. This would be reducing them, to a state of paralysis simply: but the power of muscular contraction would seem to give way to Infl: for they certainly dilate more in Infl. than the elastic power would allow: and it must also be supposed, that the elastic power of the artery must be dilated in the same proportion." And he comes to this conclusion "When we consider the whole of this as a necessary operation of Nature, we must suppose it something more than simply a common relaxation, we must suppose it an action in the parts, to produce increase of size, to answer particular purposes, and this I should call the action of dilatation."

Such likewise was nearly the opinion

of Dr. Cullen and Dr. Thomson, to whose work on Infl. I must refer you for his observations and experiments, on the current of blood tho' the capillaries, resulting from the application of different substances, but which you must, at the same time recollect have been objected to by some as inconclusive, inasmuch, that altho' that state of parts which was induced, viz: retardation and stagnation of the blood, bore the strongest resemblance to Infl. yet in no one instance did that state continue a sufficient length of time to allow any one of the usual accompaniments of Infl. to wit, the effusion of ms. lymph or mortification to be produced, since each variation terminated more or less speedily by the restoration of the natural current.

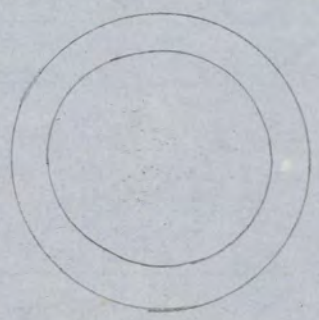
According to Gendrin "The capillaries around the irritated part dilate, and seem to multiply themselves, because a greater number is perceived on account of the red blood, which by coloring them renders them more visible. The globules arrive, they are crowded together, their motion is retarded, and at length suspended: they revolve upon themselves, and at length are entirely at rest. The capillary circulation is then evidently suspended at the

point irritated: for some distance around the retardation of the circulation, and dilatation of the capillaries are plainly seen: a little further off the circulation is more rapid the capillaries being still dilated; finally, at the limits of the inflm. areola, the circulation is, on the contrary, greatly accelerated, the capillaries dilated, and the blood contains a greater number of globules. All these changes may take place in four or five minutes and the same space of time is sufficient to allow of the capillary circulation returning to its natural state.

The swelling, is caused at first by the increased quantity of blood, and subsequently by the effusion of serum, blood, lymph and pus. It is most remarkable in loose textures: also in the breasts, testicle, and lymphatic glands.

The unwonted accumulation of blood will alone occasion this in the part inflaming; as is exemplified by the slight yet palpable elevation of the skin in erythematous inflm. ere effusion has occurred. But as a symptom of inflm, it is mainly caused by an escape of a portion of the vascular contents, into the intervascular spaces. The action yet nascent,

serum is effused: in its second stage, the liquor sanguinis is found: or fibrin more or less separated from its serum: and this fibrin is of high plasticity, and with it is mixed blood extravasated in mass, the result of vascular lesion, and ultimately muralet formation is more or less advanced. So that, by reference to the diagram, you will see that we have centrally, a soft fluctuating



swelling, where there is blood and pus: surrounding this a ~~[illegible]~~ dense and unyielding circle, somewhat diffuse and usually less prominent than the centre, the result of plastic fibrinous accumulation; and exteriorly to both, a soft pitting oedema, more or less extensive, according as the fibro-cellular tissue has been filled by serous effusion. The combined result is softening of texture, and enlargement as well as impairment of cohesion.

Swelling like redness will not alone indicate inft: it must be conjoined with other symptoms. In simple oedema there may be much swelling, yet there is nothing of the inft. process.

It is also of gradual and recent formation, not suddenly developed, as in the bulging of a hernia or dislocation, or the sanguineous infiltration consequent on a blow: nor of a tedious growth and ancient origin as in the genuine tumor.

The tendency of swelling is beneficial or otherwise according to the part affected. If this be internal, of delicate texture, and important in function, swelling may prove to the last degree injurious, as in the brain. Or a part, comparatively of itself, of little importance, may be in the vicinity of one which is of the greatest: swelling of the orbital tissue will so affect the eyeball: infl swelling of submucous tissue, may fatally occlude a mucous outlet, as in the glottis. On the other hand, swelling is usually a fortuitous occurrence, and as such encouraged by the surgeon: if the part be situated exterior, as in the subcutaneous cellular tissue: or if it be neither of itself of delicate texture, nor endowed with function necessary to the animal economy, nor closely connected with one which is either or both — as the textures occupying the intermuscular spaces. The over distended vessels are relieved of part of their

burden; and an opportunity varying according to the extent and rapidity of the effusion, is thus afforded them of recovering from debility, regaining their normal tone, and once more controlling the circulation of their contents. Always provided, however, the effusion from the vessels, and the yielding of the surrounding texture, to receive that effusion, to advance consentaneously, and in harmony.

Of this favorable kind are very many of the swellings in an inflaming part, with which the surgeon has to deal, as in erysipelas phlegmon, fractures, bruises, etc. It is, therefore, an error to regard the amount of swelling as a certain index to the extent of mischief; nor ever ought great intumescence to warrant, of itself, a gloomy prognosis. Further, swelling is not to be invariably prevented nor opposed in its progress; on the contrary, it is often to be invited to the part, and when there, promoted in its advancement. We have seen that the most prominent change effected in the blood by Puff, is increase of the proportion of fibrine; this, then may be regarded as the principal inflam. ingredient in that fluid. If much of it be extruded from the vessels, either *per se* or along with the serum, it were most reasona

ble to expect benefit from such an event. And thus we may have another reason in favor of suppuration as a salutary occurrence.

The exudation of plastic fibrine is also advantageous, as constituting a most important limit to the central suppuration when that occurs.

From what has been said, it must be apparent to you, how the tendency of healing is prominently connected with the texture of the part: the less yielding, the less favorably disposed for effusion. The action increasing so does the escape of the vascular contents, but should the texture refuse to accomodate this growing addition to its bulk, there arises, as it were, a struggle between the unloading vessels and the unyielding part, the issue of which is sure to be disastrous. It is the Surgeon's duty to watch this, and either maintain or restore harmony, if possible. Otherwise pressure from the pent-up effusion reacts disadvantageously on the blood vessels and nerves of the part: tension is soon accompanied, by throbbing, heat and violent pain: the morbid action has received a powerful impulse, and advances accordingly. Or the tightness of the pressure thus caused may

be so great, as to arrest altogether the circulation in the part, already inclined to stagnation, and so render gangrene inevitable.

Hence it is that rapid swelling in a loose texture always tends to relief, as in the ordinary fibro-cellular tissue: while swelling in that which is unyielding requires both skillful and constant care, and even then does injury. Acute infl. in bone, beneath a tightly spread fascia, or between bone and its fibrous periosteum, are occurrences invariably severe and prone to result in destruction of texture. Acute action with rapid effusion in and beneath the sclerotic conjunctiva is comparatively harmless: while, in the cornea, the result is usually gangrene.

The <u>throbbing</u> is the result of obstructed circulation in the part: and will not occur at least to any extent, until the action shall have reached the period of sanguineous stagnation. Compress the femoral artery, and its play seems easy and gentle, but place a ligature around it and on the instant the blood beats tumultuously on the distal aspect, as if angrily laboring to overcome the obstructing cause. The infl. process begun, the arterial trunks in the neighborhood are found acting with unwonted energy

Throbbing is painful, at each pulsation the patient's sufferings are increased. It is then, that the nerves, already tightened in their place by the circumjacent effusion, are most severely compressed: and it is then, that the vascular coats, themselves disordered, are stretched, as well as dilated.

Increased sensibility is the result of perverted nervous function. The eye, when sound bears a flood of light with impunity: inflamed, it winces under the faintest ray shot directly upon it. The skin, in its healthy state bears much manipulation: in erysipelas, the slightest touch is resented. The stomach in health neither rejects food, nor does sensation of discomfort indicate its presence; yet the same organ becoming inflamed is intolerant of the simplest ingesta. The bladder usually awaits its full distention by urine: in cystitis, the smallest accumulation is urgently expelled.

Obviously, this is a wise and beneficial arrangement; but as we shall see, it is one of the most important means whereby health can be met and subdued: and intolerance of function is effectual, not only to suggest the propriety of rest, but also to compel its

adoption. How lamentably destructive might be Inf. were it unaccompanied by pain and increased sensibility.

The <u>impairment of function</u>, which invariably attends more or less on Inf. consists, at first, in an increased irritability and morbid sensibility of external impression: but subsequently in another incapability of performing the usual offices, in consequence of structural change. At first, there is excitement or increase of the normal functions, synchronous with simple excitement of the part: then perversion of function, corresponding with the second stage of action, when delay of blood is begun, and extravascular deposit is copiously advancing. Ultimately function is depressed, and probably arrested, in that part, where the true Inf. crisis has been attained, the blood stagnating, and the structural change fairly established. On subsidence of the action, function is resumed; but when resumed, is, for some time, more perverted than previous to its arrest: and may slowly, perhaps never, return to its pristine and normal character.

The stomach infl. ceases to be useful as a digestive organ: the kidney as an excretic;

the bladder as a receptacle of urine: the brain as an organ of sense or intellect: a muscle or bone, as an organ of locomotion: an artery or a vein as an organ of circulation, an eye or ear fails in its special duty.

Exaltation of function followed by depression is well exemplified in the case of the internal organs: the heart or other contractile fibre inflaming, at first acts with increased energy, but subsequently with feebleness and irregularity: in regard to the brain, we have at first delirium and convulsions, then coma and paralysis: in the early stage of inflm. of the spinal chord, there may be tetanic convulsions, afterwards follows paralysis.

But perhaps, the most obvious illustration of this symptom is as respects secretion from a mucous membrane for example — as in a nascent gonorrhœa. At first the ordinary mucous secretion is augmented, probably in a diluted form, containing an unusual amount of serum: then it grows less copious and more glutinous, the liquor sanguinis contributing more to its formation: by and bye it changes still more, and has a puriform or milky appearance; and soon it is altogether arrested, the dry mucous lips then bearing more pain

Secretion

redness heat and throbbing than before.

But true acute infl. cannot long persist without inducing either ulceration or gangrene, the action generally declines and the part is moist again: at first perhaps, blood escapes or this may happen previous to declension: then suppuration, real or apparent: then the plastic vessels and the serous fluids once more, and ultimately the settling down to the ordinary mucous secretion. Or metaphysis may carry the illustration a step further, by repetition. At an early period of the disease, while matter is flowing in profusion from the orifice, an intensely strong injection is applied, not of the nitrate of silver: the discharge is speedily arrested, but the disease is not cured, for the ordinary signs of Infl. are aggravated, and the discharge now reappears more copiously and inveterately than before. The action had begun to decline, but the ill-advised remedy, acting as a fresh exciting cause, brought back the true Inflam. crisis.

Inflam. is capable of altering all the mechanical qualities of matt: 1st The weight is always increased, if the Infl. be ~~recent~~ recent, and if it have not existed long enough

to induce atrophy: 2d. Cohesion, or hardness is always diminished in acute Inf. altho' this is apt to be overlooked in consequence of the increased density. This softening arises from the effusions which infiltrate the tissues. Hardness may be increased in chronic Inf., sometimes because the whole bulk of the part is shrunken, sometimes because of the organization of lymph. Hardening from chronic Inf. was formerly termed Schirrus, and the term is still used in this sense by the French, altho' it is far better to employ it to designate a definite malignant disease. Cohesion

3d. Transparency and polish, are always impaired. Transparency

Morbid Anatomy. The ordinary post-mortem appearances of recent Inf. are redness, softening, swelling and infiltration of serum. It is necessary, however, to make a few observations respecting these phenomena, and especially concerning redness, because, in the first place, it may disappear altogether after death: secondly, it may be simulated, by redness from congestion, which existed during life: and thirdly, it may be simulated, by certain appearances produced after death.

In the first place then, redness, if very slight may disappear from Infl. skin after death; but if the bloodvessels were injected the vascularity would be found increased: besides that the part would be softened, and slightly infiltrated with serum, and that the epidermis would peel off more readily than natural.

Secondly redness may have been caused during life, not by Infl. but by congestion, from an obstacle to the return of blood: and congestion may also be attended with softening, and serous effusion, so that in some instances it cannot be distinguished at all from Infl. and in others not with certainty. The general distinction is, that in congestion the larger veins are distended more than the capillaries, and previously to them, whereas it is the reverse in Infl. The diagnosis will be aided by observing whether there is any cause of obstruction to the venous circulation.

Thirdly, the redness of Infl. may be required to be distinguished from certain appearances produced after death (1) By the action of the capillaries, which continues after that of the heart has ceased; so that the arteries are emptied, and the blood accumulated in various internal

internal organs, especially the lungs and spleen. (2) By gravitation, by which the most dependent parts of the body, and especially of the lungs, are always more or less congested. (3) By transudation of the serum and coloring matter thro' the coats of the vessels, in incipient putrefaction: which is a frequent cause of red spots and stains on internal surfaces, and of collections of bloody serum, in the various cavities.

Time does not permit us however, to dilate upon these topics they are merely adverted to for the purpose of showing, that redness, softening, swelling, and serous effusion, must not be hastily received as evidence of Gastritis, unless accompanied by some more decided effect, such as lymph, or pus; seeing that they may be produced by other causes, both before death, and after it.

Causes of Inflammation.

The word cause, in a strict and logical sense, signifies the object or event which immediately precedes any change, and which in similar circumstances is always followed by a similar change; but in medical writings and particularly as applied to the objects or events which produce Infl. the term cause is used in a much more extended and indefinite sense. Accordingly, you will find that the causes of Infl. as of all other diseases, have been usually divided into the remote and proximate: but this is a division which is inaccurate, and of no practical use. By the proximate cause of Infl. pathologists in general, wish to express that state of the body, or rather of the part affected with Infl. upon which the phenomena peculiar to Infl. more particularly depend. In this sense, the term, proximate cause, it is obvious, is merely another name for the state of Infl. and being in fact the disease itself, it neither admits nor requires of being distinguished from it.

Nor does the epithet remote, as applied to the causes of Infl: appear to be more happily chosen, for under this term are comprehended all those agents, events and states which contribute immediately, as well as remotely, directly as well as indirectly to the production of that state.

When Infl. occurs, as it not unfrequently does, without our being able to trace its production to the action of any obvious cause, it is termed spontaneous inflam. But in most instances we are able to trace the origin of Infl. to causes which act either directly on the part becoming inflamed, or indirectly thro' the medium of those sympathies which connect distant parts of the body with one another.

As exemplifying this last class, it is only necessary to remark, that particular kinds of food taken into the stomach, or mercury or arsenic given in small doses, often, without appearing to affect the organs with which they come into contact, produce each a distinct and specific Infl. of the cutaneous texture. The exposure of the feet to cold in one person occasions infla of the throat; in another Infl of the chest, and in a third, inflammation of the belly.

Very striking diversities are observed in the effects that result from the operation of the same causes, according to the differences in the structure of the parts on which they act, or according to peculiarities of Constitution. Such for example, are certain temperaments and periods of life, the influence of particular climates, and the use of particular kinds of food.

The varieties of constitution which modify the operation of the causes of Ref. have been distinguished into two classes: first, such as are peculiar to certain particular individuals; and secondly such as are common to many. In other words these varieties are either special or general. The former are termed <u>idiosyncrasies</u> and the latter <u>temperaments</u>. To these we might probably add, a third class, namely <u>diatheses</u>, or morbid dispositions.

Idiosyncrasies are innumerable in their kinds, and they are in general, discoverable, only by accident. Thus there are some persons in whom opium does not produce sleep; others on whom milk seems to act as a poison; some who are purged by astringents; and others in whom purgatives seem to produce an astringent effect.

The temperaments have long been reduced to four kinds, the sanguine - the bilious - the phlegmatic, and the melancholic. To these has been added, in modern times, a fifth, the nervous, for the distinctive characters of these various temperaments I must refer you to my esteemed colleague, the professor of Physiology.

As examples of what is usually meant by diathesis, I may point out to your notice the gouty, the rheumatic, the scrofulous, and the scorbutic, dispositions. Like the idiosyncrasies and temperaments, most of these diatheses are hereditary: yet they may also be formed by a variety of circumstances connected with climate, food, and manner of life.

A predisposition to Infl. may either exist in the general system, or it may have its seat only in some particular part. A part which has once been inflamed is in general observed to be more liable to an attack of Infl. than a similar and corresponding part, which has never been in that state.

Another general circumstance deserving our attention, with regard to the causes of Infl. is that some of them, produce their effects in

mediately, others only after a considerable period of time, in many instances not till after an interval of several days.

With these prefatory remarks, I shall proceed to consider the causes of Infl. which I shall divide into I. Predisposing, and II. Exciting. The proximate will be omitted altogether, as having already occupied our attention when treating of the Theory of Infl.

The predisposing may act thro' the general system, or on the part itself, or in both ways. 1st Unusual excitability, may reside in a part or in the system, by exaltation of the nervous function. When occurring locally, it manifestly predisposes to Infl. whose first movement is an impression made on the nerves by the exciting cause. By prolonged use, for example, the eye has its sensibility exalted, and the induction of ophthalmia is favored. 2d Plethora may be general or local: the former either the result of original temperament, or casually induced, as by excess in diet — may, by the abundance of material which it supplies, favor increased flow of this to any particular part, and facilitate the occurrence

of Inf. but it is probable that it does not act so often or so much in this manner as is generally supposed: the blood itself is not predisposed, the red globules are in excess not the fibrin. But there can be no doubt that local plethora, that is determination of a blood to a part, however induced, predisposes and that strongly, to Inf: whose first movement, after the nervous impression, is this very sanguineous determination. Increased and sustained use of a part, as of the eye, kidney or liver, both heightens its sensibility and brings to it a determination of blood; and thus doubly predisposes to Inf. It is familiar to all how every organ thus exercised is prone to be inflamed. It may be further observed, that local plethora, with the disposition to perverted vascular action, which it engenders, has an important relation to age. In infancy and childhood the brain is peculiarly liable to suffer: in adolescence, towards puberty, the pulmonary organs: in the adult, the abdominal. 3° Debility general and local. This is by far the most prolific class of predisposing causes. A vital power or strength resides inherently in the system, and in parts of that system

whereby morbid action, resulting from the application of an exciting cause, is either resisted successfully and averted, or when commenced, is controlled and modified. The greater the impairment of this vital power, the more prone an system and part to the occurrence of disease. Inf. then often predisposes indirectly to Inf. A part inflamed, we formerly saw, has its vital power impaired, and never again wholly regains it: it remains weak, and consequently, predisposed to a recurrence of the action; ready to be overcome by even a slight exciting cause, whose stimulus it could have previously borne with impunity. Bad food, air, and clothing; intemperance; excessive and habitual evacuations, previous disease, and often the treatment necessary for its removal — are familiar examples of causes of debility, and consequently of predisposition to Inflammation.

The predisposing causes may be combined. An eye, for instance may have a determination of blood towards it, at the same time that its sensibility has been exalted by unwonted exercise of function: at the same time, by a previous Inf. the part is weak, and by confinement, bad air or food, sustained

mental exercise, or all together, the frame also is debilitated. A part thus unfortunately situated can scarcely avoid a high and injurious action.

Our second division includes the Exciting or those which directly induce the morbid action. Such as 1st Ordinary irritants, as acids alkalis, many salts, alcohol, turpentine, etc. acting by direct stimulus on both nervous and vascular systems of the part. 2d Wounds, and other mechanical injuries which require a certain amount of vascular action for their cure: not unfrequently that action is, by circumstances, carried beyond what is simply salutary and prolonged into true Inflammation is established, and the process of healing delayed, until the action shall have again subsided from the Inflammatory acme. 3d Lodgment of foreign bodies. A wound is not unlikely to inflame, but if it contains extraneous matter, which is not removed, inflam. is inevitable— the result of prolonged application of stimulus. 4th Pressure is, in like manner, a prolonged stimulus, if slight the absorbent system may be chiefly excited, causing simple absorption: if severe, as well as sustained, the

nervous and vascular suffer as well. Inflam is produced, and may cause true ulceration or even gangrene. 5th Heat is a most powerful agent. Extreme it may at once reduce the part to the form of a dead eschar: applied more leniently, it proves a stimulus to both nerves and blood vessels, inducing perverted action of the latter, varying from simple excitement to the most intense Inflam.
6th Cold, considerable and sustained may act, as an excitant of Infl. either on the part itself, whose temperature is diminished, or on some other at a distance. (1) at a distance. Cold is applied to the feet and legs, or to a large part of the general surface. Circulation is enfeebled there, as shown by the pale and shrunken integument. The blood, instead of being equably distributed over the body, is pent up within and overloads the internal organs, one of them, the lungs, for example — is more burdened or more susceptible than the others: it has obtained the first vascular move for Infl. that process is begun and advances. (2) On the part itself: not by the first effect of the cold, but by reaction following upon this. While decrease of temperature is maintained

in the part, comparatively little blood circulates therein, its nervous influence is depressed, and all vital power, as well as action is enfeebled. On withdrawal of the cold influence, blood rushes back to the comparatively empty capillaries, nervous energy is restored with a tingling: simple vascular excitement, or in other words, the first stage towards Inft. is at once established, and that in a part whose vital power had just before been impaired, and which consequently is but little able to resist or control the action so commenced: this advances almost unopposed, and the part may fall an easy prey to Inft. The onset of Inft. will of course be more rapid or severe, if the cold be not merely removed, but heat, friction or other stimuli at the same time applied, nothing can be more injudicious, yet few practices are more common: grave Inft. is rendered inevitable.

7th Atmospheric change may either predispose or excite, the former when the exposure is general and habitual, usually associated with habits of intemperance, the latter when exposure is partial and sudden. It is familiar to all how inflaming eyes, throats, lungs, joints

are attributable to casual exposure to atmospheric vicissitude: the modus operandi is similar to what has been just explained in regard to cold. 8th. Undue exercise of function, in like manner, may either predispose or excite, according as it is moderate and habitual, or casual and excessive. It operates by inducing local plethora, at the same time exalting sensibility: not only inviting the action, but giving the first move in its advance. 9th. Vitiated secretion acts as a direct chemical irritant (1) from one part to another, in the same patient, as tears to the cheek, discharge from the rectum and vagina to the nates; (2) from one patient to another as gonorrhoeal discharge from the urethra acting on the conjunctiva. (3) from the lower animals to man, as in the case of the vaccine virus, and the converse. 10th. Retention of the ordinary secretion of an organ, tends to cystitis: retention of urine may be followed by cystitis: distention of the lacrymal sac by fistula lacrymalis. Secretion when healthy is no stimulus to the part; but changed in quantity, quality, or both, it may become so.

To these we may add, with John Hunter, that fever is often the cause of local Inft. These inflams. in consequence of fever, are commonly supposed to be critical, but I very much doubt the truth of this opinion. Irritating substances, says he, when of no specific kind produce Inft. sooner than the other visible causes of Inft. If of a specific kind, then the time, sort, and violence will be according to that kind. But irritating applications must be continued for some time to produce violent Inft. These differences are easily accounted for: quick death does not irritate the part killed, and the contiguous living part not being itself hurt, is only irritated to get rid of the dead part. A wound is a quick irritation of a living part, so that it inflames more readily and more violently, according to the quantity of irritation, but that cannot be of long standing, as nature sets about procuring relief. But when irritating substances are applied, the part inflames quickly, according to their power of irritation: and, if they are continued, nature is not allowed to relieve herself, but is constantly teased, by which means the Inft. becomes also violent. All Inflams. attended with

disease have some specific quality which simple Inf. has not; and in such cases it is the specific quantity which is the disease and not the Inf. There are many constitutions which have a tendency to specific diseases, that, when injured by fever or any constitutional complaints, readily produce the specific inf. in such parts of the body as have the greatest susceptibility for any specific action: or, if such parts are affected by any local violence, the parts will not go thro' the healthy adhesive Inf. but will fall into the specific Inf. peculiar to the habit; such as is the case with the erysipelatous habit; or, if a specific Inf. has already taken place any violence done to it, when already begun, will increase that disposition and action, which we see plainly to be the case with the scrofula, because this disease, can, and often does, arise from such a cause alone.

The Inflam. process may extend I. By Extension continuity of the inflam. texture, and certain textures are peculiarly prone to such extension as the skin and mucous membrane. It is no uncommon thing to find an Inf. of the skin, the result of injury and at first a mere pustule,

spreading continuously into an erysipelas. And perverted vascular action, at first limited to one portion of mucous membrane, often quickly spreads over a large space of the same tissue: from the fauces, to the larynx, trachea and bronchiæ: from the pharynx to the œsophagus, from the vagina to the urethra, from the urethra to the bladder.

II. By Contiguity: the textures successively involved not being continuous, but connected by juxta-position, and usually the more loose the intervening texture the greater the facility of extension. In neglected phlegmonous erysipelas, the action commencing in the surface may soon reach bone and joints: inflam. of a mucous membrane often induces abscess on its exterior as in the case of the urethra: action originating in the envelope of an organ, may pervade the organ itself.

The more rapid the attainment to the true inflam. crisis, in the part first attacked the more likely is the action to extend, and that quickly, to those in the neighbourhood: its advance is unopposed by attendant change of structure. In the formation of an ordinary acute abscess, the progress is gradual, and the central portion truly

inflamed is surrounded not only by serous effusion, but by a mass of dense fibrinous deposit, filling up, and as it were, fortifying the previously loose tissue, and exerting a restraining influence on both the extension of the disease and the diffusion of its products. In phlegmonous erysipelas, on the contrary, the crisis is much more speedily effected, there is no such salutary barrier, the surrounding texture remains open to both extension of puff and the diffuse infiltration of matter, and the consequent mischief is often great and irreparable. The limiting fibrin is either not deposited: or, as is more frequently the case, the exudation is of an aplastic kind.

Many are the advantages derived from true puff, being preceded by active congestion, suppuration being surrounded and limited by plastic fibrinous deposit. Often the texture and efficiency of an internal organ are thus saved: as such as the eruption of pus into an internal cavity prevented, peritling life, either by compression of some neighbouring part or by violent inflam. of the lining membrane of the cavity.

III. Extension of the inflam. process may be

Remote: that is the part secondarily involved, is at a distance from the original site of action: and the intervening parts are unaffected. This may be effected by 1st The Blood. This fluid, as we have seen, emerges from the inflaming part, charged as from a laboratory, and circulating thus altered to other and distant parts, may itself become the exciting cause of perverted vascular action there. Purulent formations — in fact, unusually acute abscesses — occurring in certain forms of phlebitis, at a distance from the affected vein, may be thus satisfactorily accounted for. 2d By the agency of the lymphatics. A part is inoculated by a hurtful virus, and both result in the wound: besides, a portion of the virus has been carried on by the absorbents, not only contaminating the system thereby, and so establishing constitutional disorder, but lighting fresh fires in its onward track — It may be while the conducting apparatus is altogether or almost unscathed. Thus a poisoned wound of the finger gives at first simple paronychia, and then abscess of the axilla, often without any apparent affection of the lymphatics. When they suffer, it is a case of continuous

as well as of remote extension. 3d By nervous agency. By this, sympathy of function is maintained in distant parts in health; by the same agency, sympathy of action may be established in disease. Thus morbidly as well as ordinarily the uterus is found sympathizing with the mammæ: the testicles with the urethra, and the kidney with the bladder.

Constitutional Symptoms.

The human body, considered as an organised whole, is a very complicated system, comprehending in itself a great variety of subordinate systems, organs, and textures. In the different states of health and disease, these systems act and are reciprocally acted on by each other. No sooner, therefore, does any one of the subordinate parts of the animal economy receive an injury, than changes are induced in the general system, corresponding in some degree to the nature, seat and extent of the local affection. In many instances, indeed, when the local affection is internal, and of course concealed from our immediate observation, these constitutional changes are

often the chief, if not the only matter, which, previously to death, and the dissection of the body, we have of the existence of internal local disease. The brain and nerves seem to be the common centre or general medium, thro' which the reciprocal influences of the different parts of the animal economy are exercised, the organs which first sympathise with local affections, and which, by their reaction on the other organs and systems of the body, produce in them all the variety and diversity of constitutional effects which we perceive to occur in disease.

All the different systems, organs, and textures which enter into the composition of the animal economy, are liable to be more or less sympathetically affected by the occurrence of local hfl. but perhaps the most remarkable and important of the constitutional effects arising from that state, may ale with propriety, be referred to one of the four following general classes of phenomena.

I. Morbid phenomena, occurring in and depending upon changes, induced in the general or local action of the sanguiferous system. To this we may refer 1st. Variation

in the strength and frequency of the arterial pulsations. 2d. Variations in the degree of temperature or of animal heat, either in the whole body, or in particular parts of it: 3d. Variations in the state of respiration. 4th. Variations in the dryness or humidity of the skin. 5th. Spontaneous haemorrhages. 6th. Variations in the state of the different secretions.

II. Morbid phenomena occurring in the digestive organs, and in the organs subservient to the process of digestion. To this we may refer. 1st. State of salivary secretion. 2d. State of tongue, as to moisture, color, crust, etc. 3d. Variations in the gastric fluid, thirst or appetite, indigestion, etc. 5th. Variations in the biliary secretions. 6th. Griping, purging of fetid, mucous, bloody, and bilious matters.

III. Morbid phenomena occurring in the nervous system, considered as the organ of sense and intellect. To this we may refer. 1st. Syncope; sudden sickness, shivering, coldness of the extremities. 2d. Watchfulness. 3rd. Delirium, mild and ferocious. 4th. Mania. 5th. Coma: 6th Apoplexy. 7th. Derangements, variations or deprivations of the sensation of sight hearing, taste, smell, and touch.

IV. Morbid phenomena occurring in the organs of voluntary motion. To this we may refer all convulsive or spasmodic affections, as 1st. Subultus tendinum 2d. Spasms of the voluntary muscles. 3d. Spasm of the involuntary muscles. 4th Tetanus, hydrophobia, hysteria and epileptic affections.

This enumeration of the constitutional morbid phenomena arising from local irritation is by no means intended to exhibit a complete view of these phenomena, but merely to point them out to your notice as objects most particularly deserving of your attention and study. It is in the knowledge and treatment of these, and similar morbid phenomena, that the boundaries which divide Surgery and Physic, meet and are lost in each other: for whatever inaccuracy distinctions may have been introduced among the practitioners of the healing art, there is no foundation for these distinctions; either in the nature of disease, or in the knowledge which every medical man should possess of the appearances which different diseases exhibit, and of the means by which they are to be removed. Both in learning and teaching the elements of physic

and surgery, you are ever to bear in mind, that they are branches of the same art, have had the same origin, are governed by the same principles, and pursue entirely the same object.

In the definition given of local Infl. you will remember that it was stated, that the coexistence of the four symptoms, redness, pain, heat and swelling in any texture or organ of the body, was, in general accompanied by a greater or less degree of fever, and that from this circumstance had arisen the distinction made by medical men, among the symptoms of Infl. and of Inflam. diseases, into those which are local and those which are febrile or constitutional. By some it is considered improper to give the name Fever to the constitutional symptoms which accompany local Infl. but in answer to this, we may remark, that the term has been sanctioned by long use, and that the addition of the term symptomatic, to that which accompanies Infl. whether it arises spontaneously or is produced by external agents, prevents us in every instance from confounding the febrile symptoms arising from Infl. or other local diseases, with those combinations or trains of symptoms which are

produced by causes operating on the general system, without immediately exciting Infl. and to which nosologists have given the name of Idiopathic or primary fevers. In the second place, it may be remarked, that the symptoms which occur in symptomatic or secondary fevers, resemble those of idiopathic or primary fevers so exactly, that, but for the local affection, it would be impossible in many cases to distinguish these two classes of fevers from one another: and, in the third place, I may observe, that not only are the constitutional symptoms which accompany Infl. included in the definitions which are usually given of idiopathic or primary fevers, but we shall find that symptomatic fevers exhibit the same forms of febrile phenomena, with idiopathic fevers, hold the same course, undergo the same changes, possess similar characters, form similar species, and require the same means of cure. It cannot be too often repeated that the terms Fever in Physic, and Infl. in Surgery are mere general abstract terms which do not denote any particular form of Infl. or febrile disease. They are only used to express the occurrence, co-existence and succession of phenomena, which by their

particular combinations constitute classes orders, genera, and species of Inflm. and Inflam diseases: and as no one form of Inflm. disease has a better claim to that appellation than another, so no one combination of the symptoms which constitute the state that has been denominated Fever, appears to be exclusively entitled to that term.

In proof of the close and intimate relation subsisting between the state of Fever and that of local Inflm. it may also be remarked, that as local inflm. gives rise to constitutional symptoms, so idiopathic fevers, of all kinds, in their turn, often give rise to or at least are accompanied by local Inflm. affections. Indeed local inflm. may take place in all periods of idiopathic fevers, and in innumerable instances seems to be the more immediate cause of the dangerous or fatal effects which so frequently occur. In all febrile affections, also whether of an idiopathic or symptomatic kind, determinations of blood to particular regions and organs, are liable to occur and give rise to hemorrhagy, from the vessels opening upon mucous surfaces. In these cases the arteries leading into the places where the determinations exist, pulsate more strongly

than the corresponding arteries of the system, and a state in some respects resembling that of Infl. occurs. By some this state is denominated a hæmorrhagic effort, by others a topical fever. This increased pulsation of the arteries not only precedes hæmorrhagy, but is continuous with it, and generally goes off as the hæmorrhage ceases. It is denominated active hæmorrhage, to distinguish it from that which occurs from the accumulation of blood and distention of vessels without being preceded or accompanied in its progress by any increased pulsation of the arteries.

In the description of the febrile symptoms which accompany Infl. it is impossible to follow the order in which they occur, either with respect to the local symptoms or with respect to each other, for this order is far from being invariable or uniform. It differs in the different species of Infl. diseases, and is, perhaps, never precisely the same in any two patients affected even with the same species.

In some instances of Infl. the febrile symptoms precede the local in the order of their appearance. We have an example of this in erysipelas, where the febrile symptoms often take place in a very high degree, two or three

days before the local Inft. appear. The febrile symptoms precede the local also in small pox, measles, and in all the class of eruptive or exanthematous diseases.

In most Inft. affections arising from external injury, the constitut. or febrile symptoms succeed to the local after a distinct interval of time, in some cases shorter, in others longer. In these cases the febrile symptoms would appear to be dependent on the local affection, for when the Inft. is removed the febrile symptoms of themselves, in general disappear. There are however, it must be confessed, external injuries of a nature so very severe, as to induce the febrile at the same time with, or at least very soon after, the local symptoms of Inft. We have examples of this in burns, in very painful operations, in some injuries of the head, and in some of the more severe cases of compound fracture.

In other inflam. diseases, again, as in those depending upon Inft. of the pleura and the peritoneum, there is reason to believe that the local and constitut. symptoms are often simultaneous events, and that sometimes the one, sometimes the other class of symptoms takes the order of precedence.

I. One of the most obvious and constant of the constitut. symptoms accurring in Inflm. diseases, is an increased action of the heart and arteries, indicated by a strong full, and, in general, a frequent pulse. This strong, full and quick pulse, is one of the most characteristic marks of symptomatic Inflm. fever. Taken by itself, indeed, it does not indicate with certainty the existence of the febrile state: for it may be readily produced, as you all know, by exercise, or by sudden emotions of the mind: but, in these cases, as it is usually of short duration, it can scarcely be said to indicate the actual existence of fever. If, however, the increased action of the heart and arteries continues for some time after the exercise has been discontinued, or the emotion of the mind has passed over, we then say that the person has been thrown into a fever, or that the febrile state exists.

In inflam. diseases, this increased action of the heart and arteries may consist in an increase of strength, as well as in an increase of frequency in the contracting of the heart and arteries; or it may consist in increase of the frequency, but not of the strength of these contractions. In the former case, we

say that the fever is of the Inft. type, or that the phlogistic, or sthenic diathesis prevails: while in the latter instance, we give the name of typhoid or nervous fever to the constitutional symptoms, and in speaking of the general state of the body, say that the asthenic diathesis prevails. The febrile symptoms, which accompany local Inft. partake more or less, as has been remarked, of the character or type of particular idiopathic fevers: and it is this difference, it may be observed, in their types or characters, which occasions so much dispute with regard to the nature, and so much uncertainty with regard to the treatment of febrile diseases.

The assertion that there are only two forms of disease, sthenic and asthenic: two kinds of remedies stimulant and debilitating: that the indication of cure of the sthenic diathesis is to diminish, that of the asthenic to increase excitement and that we must go on doing so till that degree of excitement which is a medium between the extremes, and suitable to health, returns, may appear to you a doctrine as useful in its tendency as it is simple in its views. But opinions in practical medicine so very universal in their application

and so precise in their statement; altho' attractive from their apparent simplicity, cease to occupy our attention when we observe diseases as they occur in nature, the variations produced in them by the disturbance of different organs and functions in the different individuals affected with the same species of Infl. or febrile affections, the counter indications which so frequently present themselves in the treatment of these diseases, and the infinitely diversified effects which result from the same articles of food or medicine when administered to different individuals, or to the same individual in the different periods of the same disease.

II Increase of warmth in the skin, or of the temperature of the body, is another constitutional symptom occurring in symptomatic Infl. Fever. This is probably the first symptom of fever which attracted the attention of mankind, and it is that also from which fever appears to have got its name. To be hot and feverish are still in common parlance expressions nearly synonimous. Increase of warmth, which never exceeds the temperature of the blood issuing from the left ventricle of the heart, probably depends, in the commencement at least of fever, upon the

increased rapidity of circulation produced by the more frequent contractions of the heart and arteries. It is often the symptom which is first observed, and may occur without tho' it is generally preceded by a cold stage.

It deserves to be remarked, that a very unequal distribution of blood, and of course of temperature, frequently occurs in febrile affections. Thus the skin is sometimes cold when the interior parts of the body indicate a considerable rise of temperature, and one region of the body, as the feet for example, may be cold to the touch, while the head, or some other part, equally or even more exposed, feels uncommonly warm. In these irregular distributions of blood, therefore, we observe two states of vascular or arterial action, one of which resembles Inflm. in the heart and increased pulsation, and another state, which is the very reverse of this, in which the capillary vessels are probably much diminished in size from the contraction of their muscular fibres.

III Diminished perspiration is another symptom by which the state of symptomatic inflm. fever is usually ushered in; and hence it is that we say that the skin feels dry as well as hot.

But, tho' not to be considered as a symptom essential to the existence of fever as Dr. Cullen supposed, yet it occurs sufficiently often in symptomatic, with fever, to justify us in classing it along with the more constant phenomena of that disease: and the restoration of the perspiration, it may be remarked, is almost in every instance accompanied by the abatement of the other symptoms of fever. It is with a view, therefore, to produce this effect, that we shall afterwards find diaphoretics have been so warmly recommended, and so frequently used among the means of cure.

The perspiration is not the only secretion which is diminished during the continuance of the febrile state. There is great reason to believe, that all the other secretions of the body are similarly affected. The flow of saliva, for instance into the mouth is diminished, and ulcers secreting pus on the surface, or into the internal canals of the body, are dried up on an attack of fever. The urine is not only diminished in quantity, but its chemical properties appear to undergo considerable alterations. Tho' of high color, it deposits upon standing no lateritious sediment, or uric acid — a phenom

nomenon which it almost never fails to exhibit, the moment the fever is beginning to abate.

IV. The loss of appetite, nausea, and vomiting, which occur in symptomatic or other fevers, are perhaps also to be referred to the suppression of the secretion of the gastric liquor in the stomach or to some change induced in its qualities by the presence of the fever. Want of appetite and nausea are among the more common and constant symptoms of fever: but the vomiting which is occasionally excited, probably depends for its cause on the quantity of food remaining in the stomach after the commencement of the attack, or upon changes induced in the quantity and quality of the bile, and other fluids secreted into the alimentary canal.

The furred tongue is an extremely frequent symptom of fever. Taken along with nausea and loathing, it is one of the best guides we have in judging of the state of the alimentary canal, and in enabling us, in most instances of fever, symptomatic as well as idiopathic, to determine with much accuracy, whether the patient is likely to receive most benefit from animal or vegetable nourishment. A furred tongue will in most diseases be found to be as natural

a symptom of derangement in the digestive organs, as an increase of strength or frequency of arterial pulsations is to be regarded as an indication of the strength and number of the hearts' contractions. The fur which covers the tongue in febrile diseases, occurs chiefly about the middle and back parts of this organ. It is of a whitish, yellow or brown color, variable however in shade, and of a firm consistence. It does not admit of being wholly scraped off, but as the fever abates it comes away spontaneously. It is not easy to account for the origin of this crust: for did it arise entirely from a change in the nature of the saliva secreted, instead of being found on the upper middle and posterior parts of the tongue, we should find it incrusting the whole internal parts of the mouth. It is probably secreted, therefore, from the papillae to which it adheres.

V The head-ache, pain of the back, anxiety and restlessness, which occur in symptomatic fever, are most probably affections of the nervous system. They seem to be almost essential symptoms as they are present in a greater or less degree, during the commencement and progress of almost all fevers.

The intellectual functions also are, in

fevers of the symptomatic kind, often disturbed by the occurrence of reverie; and this sometimes increases to such a degree as to terminate in mania or delirium. Delirium and mania, when they occur in symptomatic fever, are often connected with an increased action of the heart and arteries, and with a particular determination of blood to the head. At other times, these symptoms occur, without the local circulation appearing to be much, if at all disturbed.

Nothing can be more various than the progress and termination of the different kinds of symptomatic fever. In some diseases they occupy distinct periods of time: in others, their duration, as well as their severity, is modified by constitution, mode of treatment, climate and season of the year. Many of these fevers terminate favorably of themselves, some never without the judicious interference of art, and in others again it is often difficult to say, whether it be art or nature which contributes most to bring about a favorable termination. But it is far from my intention of encroaching on the province of the Prof. of the Theory and Practice of Medicine, to whom I beg leave to refer you for a more minute and extended

consideration of the symptoms indicating the presence of symptomatic, and pass on to the investigation of one other circumstance respecting local infl. disease which requires our serious attention. I allude to the particular appearance which the blood exhibits, after it has been drawn from the veins of patients affected with this class of diseases. This appearance, the appellation of which at least, must be familiar to you all, has been long known by the name of the Inflammatory crust, or Buffy coat of the blood. The blood undergoes serious changes in the part inflamed and by a constant succession of such changes, the whole fluid comes at length to be altered almost to the same extent, as that portion of it which has just emerged from the seat of local action. Draw blood directly from the part, as well as at a great distance from it, and the two fluids will exhibit nearly the same characters of change. Its coagulation is generally slow, and results in a clot unusually dense: surrounded by serum, apparently increased in quantity, because thoroughly squeezed out of the solid matter. In the clot the fibrin and colorless "lymph globules" increase both in quantity and in tendency to aggregation

go together: separating from the red corpuscles, probably diminished in number, but having also their tendency to cohesion augmented: the red corpuscles occupying the lower place, the fibrin and lymph globules the upper, rendering the surface of a yellowish hue; and hence to such blood the term "buffed" is ordinarily applied. But the increased aggregation in the fibrin, not only leads to separation from the red corpuscles: it causes contraction of the buffy layer. The contraction being centripetal, the circumference of that layer leaves gradually the sides of the recipient vessel: the weight of the general clot at the same time dragging on the centre, a hollowing of the fibrinous surface is effected, and the blood is said in consequence to be "buffed & cupped". The coagulum is usually in the form of an oval, truncated at both extremities, with its base broader than the top, and often adherent to the bottom of the vessel. Slightly buffed, the clot is usually cylindrical, and floating.

Such are the appearances of healthy blood drawn in health. If it be taken in a full stream, in a deep vessel, exposed to warmth, these appearances are favored: a tiny trickling

stream, a shallow vessel, and exposure to cold, are, on the contrary, unfavorable to their occurrence. Also, at different times of bleeding, and even of the same bleeding, such characteristics may vary: the first drawn may be neither buffed nor cupped, while that which flows last is both, and intensely so. When the blood is but slightly changed, it is said to be "sizy".

But it is not essential to have the blood in mass. A thin film, as on a plate exhibits a similar change. The separation between the fibrin and colorless particles is effected laterally instead of vertically, as in the mass: breaking up the homogeneity of the film, much more than in healthy blood, and giving it a spotted or mottled appearance, but only after some time has elapsed: in buffy blood the change is immediate and most distinct. This renders us independent of form in the recipient vessel.

I must here caution you to bear in mind that the buffed appearance is not of itself a sure indication of Inf. It may be seen in blood drawn from chlorotic as well as from pregnant females: from patients affected by sanguineous plethora, or from any one whose

circulation has been much accelerated, as by violent exercise. And, on the other hand, we know that an active and most serious inflm. may be present, while in the blood the ordinary inflm. characters can be but faintly traced. These are but the exceptions, however, strengthening the general rule. Yet exceptions are important to the practitioner, inasmuch as while the presence of the buffy coat will not warrant him in reckless expenditure of blood, neither will its absence during urgency of other symptoms of inflm. be a sufficient cause for withholding the lancet.

Again, both the buffed and cupped appearances may vary according to the texture involved. Perverted vascular action in the fibrous tissue, as in rheumatism, invariably presents a high degree of change, while a much more formidable action may be advancing in the parenchyma of an internal organ, the change of whose blood is comparatively trivial. Inflm. of a serous membrane gives much of a buffy coat; less will come from a higher action in a mucous membrane, and in the inflm. arising from certain morbid poisons, as glanders, or in the course of typhus fever, when the blood having

lost its vital qualities, scarcely coagulates at all.

What is the exact physical condition of the blood, to which the buffy coat is owing? This is a question which has received many discordant answers. It was formerly said that blood which exhibited the buff, coagulated very slowly, so that the red particles had time to sink, and leave the upper surface of the clot colorless. Hunter supposed that the gravity of the red particles was increased, thro' which they sank to the bottom more quickly than in healthy blood.

The following, however, is the most modern account of the subject, which has been advanced by Mr. Wharton Jones, as the result of his microscopic examination of the blood. In the coagulation of healthy blood the following phenomena are observed. First, the red globules, by a mutual attraction, unite themselves into rolls, which soon break up into a kind of spongework, in the meshes of which all the liquor sanguinis is contained; then, the fibrin of the liquor sanguinis solidifies: and, lastly the spongework formed by the blood globules contracts itself, squeezing out most of the serum from between its meshes, but retaining the fibrin.

In buffy blood, on the other hand, the attraction of the red globules for each other is greatly increased: so that they form themselves quickly into a spongework, which quickly contracts and sinks towards the bottom of the vessel, squeezing out some of the liquor sanguinis from its meshes before the latter has separated into serum and fibrin. And this liquor sanguinis, so separated from the globules, forms the bluish white layer which is well known to appear on the surface of buffy blood soon after it is drawn. And the fibrin which it contains being deposited on the surface of the spongework, formed by the globules constitutes the buffy coat.

Generally speaking, rapidity of progress and intensity of action are phrases nearly synonymous. Sometimes the process is very gradual in its advancement: requiring, as in the example of the vaccine pustule, 8 or 9 days for its completion: and many cases are yet more protracted. After a wound or other mechanical injury, the process is usually complete and suppuration established by the 2d or 3d day. One day or less suffices for the occurrence of suppuration in many cases of phlegmonous erysipelas. And the

secondary abscesses attendant on phlebitis there is every reason to believe, are begun and completed within a very few hours.

Progress varies as to time and character, according to. 1st. Structure of the part affected. The more highly organized, vascular, and endowed with nervous energy the more rapid and sthenic the action — caeteris paribus. 2d. Situation of the part. The nearer to the centre of circulation the more disposed to rapidity and intensity of action. 3d. State of the part. When vital power has been impaired by previous Inflm. or other debilitating cause, the part is prone to assume morbid action, and this invariably tends to a speedy and unfavorable issue. All adventitious structures, also, being of low organization, and vitally weak, soon yield before Inflam. 4th. Temperament of the patient. The sanguine favors both rapidity and intensity: in the nervous action is readily induced, but it is prone to assume the asthenic and chronic form, the phlegmatic is unfavorable to occurrence, rapidity and intensity. 5th. Diathesis plainly modifies action, both in its occurrence and character, as exemplified in the scrofulous and rheumatic Inflam.

6th Age. In childhood and infancy, vascular action is both likely and acute: often its progress is fatally rapid. In adolescence, its general character is also acute, easily induced, but not apt to tend disastrously, there being usually enough of vital power to maintain control: then too by reason of habitual activity in the nutritive function, action is usually attended by copious exudation of the more solid kind, either fibrinous, or albuminous according to the power and disposition of the system. In adult life, action is probably less easily induced, but is usually acute and sthenic. Old age is more prone to passive congestion: when the Inft. process does occur, it is generally languid, slow and tends to an unfavorable result: for both part and system are lowered in vital power. 7th as regards Sex, females are constitutionally prone to Inft: but males are more exposed to casual predisposing and exciting causes. The latter sex too, may be considered as pre-eminently liable to action of an acute and sthenic type. 8th Habits of Intemperance predispose to Inft, rapid intense, and apt to end injuriously. Sedentary habits are also favorable to accession, but usually the action is more under control.

Privation, involuntary or assumed is unfavorable to accession, and action is usually chronic and asthenic. 9th Atmosphere and season are related to Infl. not only as important predisposing causes, but also as materially influencing its progress and type. An evil atmosphere impairs the vital powers and so favors the onward progress of morbid action to a rapid and unfavorable issue. In like manner, an unhealthy season, fully vindicates its title to the name by its subtle and sinister influence on Inflammatory as well as on other forms of disease, as the history of erysipelas, when epidemic, abundantly testifies.

Terminations of Inflammation.

Inf. has only one genuine result or termination, namely resolution, or recovery: the inflam. action subsiding and the part returning to its former state; but beside resolution, it may either of the following big terminations or effects, or consequences, as they ought rather to be called. I Hæmorrhage. II Effusion of Serum. III Effusion of fibrin, or of coagulable lymph, which when organised produces adhesion. IV. Suppuration the formation of a peculiar fluid called pus, closely allied with which is the change called ramollissement or softening. V. Ulceration the disappearance or removal of an Inf. part. VI. Mortification, or its death.

It must be understood that except suppuration and adhesion, these effects may also be produced by other causes besides Inf.— congestion, in particular, may cause hæmorrhage, serous effusion, ulceration and gangrene.

In resolution the appearances of Inf. subside nearly in the same order, as in their development, they set in with, and the diseased part reverts to its natural condition. The pain diminishes or disappears first: in the same degree

the temperature and redness lessen, the swelling alone often remains for a still longer time, till the absorption of the serous or albuminous fluid poured into the cellular tissue is effected.

We hope for this result when the Inf. has not quickly run on to a great extent, the pain neither particularly severe nor throbbing and when the fever accompanying the Inf. terminates critically in perspiration and deposit in the urine, and it is to that to which treatment is usually directed. But, let it never be forgotten that such treatment must be early as well as suitable and active: inasmuch as this result can only be hoped for while the action is yet beneath the inflam. acme. That once reached, true resolution — that is restoration of the part as regards both structure and function to its original and normal state — is impossible.

Resolution may be gradual or sudden, spontaneous or artificial, imperfect or completes the more early and slight the action, the more likely is the resolution to be rapid, spontaneous and perfect.

Resolution is distinguished from the disappearance or cessation (the délitescence of the French) of Inf. which is, in general connected with its simultaneous or speedy development

in another organ. This recession depends on the succession of an irritation which is more severe than that which kept up the earlier Infl. It is often merely a state of <u>changed vital activity</u>, of increased sensibility, which produces the removal of the Infl. particularly if it be treated with repelling astringent remedies. Certain Inflams. as erysipelas, and critical Inflams. have a peculiar disposition to recede, and are often followed by establishment of the Infl. process in a serous or mucous membrane, or even in the substance of an important internal organ; and such change may be fatal. The process effecting subsidence of the original action, and establishment of the new, is termed <u>Metastasis</u>.

Metastasis may be only apparent. Often disappearance of an external Infl. is quickly succeeded by supervention of an internal: and the latter is rightly held related to the former, as effect to cause. Yet not unfrequently we may have the two circumstances contemporaneous or nearly so, with their relation reversed; the internal disorder proving the cause of the subsidence of the external — the less merged in the greater malady.

The process of resolution has been well

described by Dr. J. H. Bennett in the following words. "Resolution or absorption of the exudation may occur in various ways, and follow any of the transformations of the exudation except the one which converts it into permanent tissue. The early phenomena first disappear: the capillaries recover their contractility: the attraction between the blood and the parenchyma ceases: and the blood within the vessels begins to oscillate, and at length flows in a continuous stream. Secondly, the essential phenomenon disappears, no further exudation takes place, and that already poured out, is absorbed. It occasionally, tho' rarely happens, that the exudation does not coagulate for some time after it is exuded. Under these circumstances when the early phenomena terminate, it recenters the vessels by endosmosis, unchanged. In the majority of cases, however, it coagulates, and once rendered solid, it could never be absorbed without the occurrence of changes, by which it is again rendered fluid. This is effected by the formation, opening, disintegration or decay of nucleated cells, whereby the coagulated exudation is broken up, made soft, pultaceous, and diffluent, and at length absorbed. By this process exudation poured out into the lung or brain, gradually

disappears by the production of fatty softening. On the serous surfaces, the fluid and broken down corpuscles are absorbed: but that portion which passes into permanent organization is transformed into fibrous tissue, becomes covered with a smooth membrane so that the functions of the organ are not disturbed. Abscesses when resolved undergo a similar process. The pus-cells instead of being evacuated are brought closely together from the absorption of the more fluid portion. These are gradually broken down, the cell-walls are dissolved and the whole is reduced to a molecular matter, which cementes the vessels and thus complete resolution is produced. The disintegration of pus-corpuscles previous to absorption is eminently favored by the pressure which the abscess receives from the contraction of the filamentous and elastic tissues which form its walls. It is probable also, by increasing the contraction of the integuments, as well as by removing fluid from the neighbourhood of the part, that irritants, blisters, and cauteries are so beneficial in the resolution of abscesses. It is suggested by Zimmerman, that the formation of an acid, as the lactic, in abscesses, when fully formed, favors their disintegration.

As to the question "What becomes of the molecular fibrin which re-enters thus the circulation?" we may state, that the observations of several German physiologists, more especially of Schönlein and Zimmerman, have thrown much light upon it, and determined that the changes which the urine undergoes in acute. Inflam diseases bear a relation to the absorption of exuded blood-plasma in internal organs. Thus, in a case of pneumonia, Schönlein pointed out that the disappearance of dulness was accompanied by a turbid state of the urine, which contained a large amount of molecular fibrin, and was also highly coagulable by heat. Zimmerman has recorded instances where the turbidity and coagulability of the urine bore a marked relation to the diminution of suppurative swellings. In some cases where purulent matter was apparently absorbed, he had only observed that the urine was coagulable from the presence of fibrin dissolved in it. Hence it is concluded that the molecules of the broken up exudation, after circulating in the blood, are frequently eliminated by the kidneys, and make their exit from the system by the urine, sometimes entire, at others in a state of solution. Occasionally the excess of fibrin

may be eliminated by the skin, lungs, and bowels. In all cases it constitutes an important symptom of the crisis.

I <u>Hæmorrhage</u>. When the process has approached the true inflam. crisis, we have seen that the altered vascular coats are apt to give way, permitting the contained blood — liquor sanguinis, and red corpuscles, in mass — to escape more or less copiously. If this occurs on the surface it is called Hemorrhage; if, in the interior Extravasation. The former most frequently takes place in infl. mucous membrane, the blood escaping by the mucous outlet, and is not to be readily checked, inasmuch as it generally tends towards a beneficial result. The implicated vessels are not only relieved of pressure — it may be the greater part of their burden; but a general resolutory effect may be obtained, as if the flow were an artificial one from a vein at the bend of the arm. In such cases, a practitioner suddenly called must take care not to suppose that to be of itself a disease, requiring immediate arrest, which is actually a means of cure directed against advancing inflam. requiring to be watched, perhaps favored, but only to be arrested when threatening to become excessive.

When however, the hemorrhage takes place

into an internal cavity; it cannot be too soon arrested, and we would rather prevent it altogether if possible, seeing that its presence bulk and pressure may excite action of a still higher grade, or seriously interfere with the functions of neighbouring viscera. In the chambers of the eye for instance extravasation may hurry on action to ultimate disorganization of the eyeball: in the cavity of the peritoneum, peritonitis may be hopelessly aggravated: in the pericardium, the heart's action may be fatally overborne: in the brain, or its membranes: coma by compression is established.

Retro-action is seldom but injurious, and therefore at all times to be avoided. Occurring in an internal organ, it occasions serious consequences, not only by arrest and impairment of function in that part itself, but also perhaps, in others adjoining, by pressure made on them. Occurring externally, it is unfavorable, as indicating a high grade of action, reaching up texture, and paving the way for suppuration.

Hemorrhage, like serous effusion, may be a consequence 1st. of Infl. and excitement: 2d. of Obstruction to the return of the venous blood: 3rd.

of structural weakness of the bloodvessels, and thinness of the blood, as in scurvy and putrid fevers. The first form is called active, the last two passive.

Active hemorrhage consists in an escape of arterial blood from the capillaries, which are most probably ruptured by the distention caused by the acute Inft. or violent excitement: and more or less of it dribbles occurs in every case of violent Inft. It occurs during the formation of abscess in the cellular tissue and in the liver. But the most common seat of inflam. hemorr. is mucous membrane, especially that of the lungs. The principal instances of it which fall under the surgeon's care are epistaxis or hæmor. from the nose: hæmorrhois, or hæm. from the rectum: hæmorr. from the urethra during gonorrhœa, and from granulating wounds. It has also been known to occur from the conjunctiva: and more rarely from the pleura, pericardium, and peritoneum.

Inflam. or active hæmorr. is distinguished from that which is the result of congestion or debility by the presence of local pain, heat, and throbbing, and of a febrile state of the pulse and system generally.

Effusion of Serum. Effusion of serum as a local disease is generally produced either by obstruction to the return of venous blood, or by Infl. Of Infl. it is the earliest and most constant effect, occurring equally in the interstitial cellular tissue – into the parenchyma of organs – from mucous and serous surfaces, and from the skin. If it is followed by any of the other effects of Infl. it is always more widely extended than they are. But it may be the chief or only effect of Inflam. as in acute dropsy, which is an example of an inflam. state rapidly producing serous effusion into the cellular tissue or great serous cavities. The serum in these cases is always of greater specific gravity, and contains more albumen, than in dropsy from debility. In patients of a lax, flabby habit of body, and in parts of loose and cellular structure, inflam. always produces more of this effect than in those of a firmer texture.

After Infl. in any part, some degree of oedema is apt to remain in consequence of the distention and weakened tone of the capillaries: and if the habit be weak, great oedema may arise from a very slight cause as a blister. It must be treated by flannel or other bandages, gentle friction, cold affusion

and attention to the general health.

Great distention of the subcutaneous tissues by serum is very apt to cause sloughing of large patches of the skin, by mechanically interrupting its supply of blood. This should be prevented by making numerous punctures with a needle, or finely pointed bistoury, and allowing the serum to ooze out.

Under the term Oedematous Inflammation Hunter describes a peculiar form of Inf. terminating rapidly in serous effusion, which occurs in those who are affected with dropsy, or disposed to it. It mostly attacks the lower extremities: the swelling is bright red, much diffused, very sore, but not throbbing. It is very apt to terminate in sloughing or suppuration, but not adhesion, and is the frequent cause of large ulcers on the legs of the dropsical.
(a) It may be effused in the interior of a part; occupying the fibro-cellular tissue, and constituting Acute Oedema. The attendant symptoms are pain, heat, and redness, proportioned to the amount of action: the swelling varies according to the extent of effusion, and nature of the recipient part: if the latter be unyielding tension ensues, with increase of pain and acceleration of the action onwards: but usually

the surrounding tissues are accomodating the swelling is found soft, when compared to that of fibrinous character, and, yielding before the finger by temporary displacement of the serum, is said to pit on pressure. This pitting, however, is much less distinct in the Acute than in the Chronic oedema.

(b) The serous effusion may be from the surface of the part; whence it flows harmlessly away, as does the ordinary secretion in health, as in the case of the mucous membrane. Or it accumulates within an internal cavity, as those of the serous membranes: constituting Acute Dropsy of the part: the bulk, uneasiness, and disturbance to healthy function by pressure, varying according to the extent and rapidity of effusion.

Acute effusion of serum, whether in the form of oedema or dropsy, usually disappears soon after decline of the action which produced it, by the resumed and increased play of the absorbents. Herein, again, it differs, practically, very much from the result of Chronic Congestion.

Effusion of Fibrin, of plastic fibrin, of coagulable lymph, adhesion, adhesive inflammation, union by the first intention, for these are all synonymous terms, used by different authors to express

the same condition of things, is a process in which the fibrine of the liquor sanguinis is effused, organized, and converted into some of the normal tissues of the body. It is the means by which wounded and fractured parts are united – by which loss of substance is restored, whether produced by injury or disease – by which cysts are formed for abscesses, so as to prevent the diffusion of pus or other morbid fluids thro' the cellular tissue – by which wounded intestines are glued together so as to prevent the extravasation of their contents, and which in disease produces thickening, consolidation and hypertrophy of organs, and obliteration of their cavities.

When first effused, the fibrine appears to the naked eye a soft and gelatinous mass of a yellowish white or pinkish color. At first it is very soft, or almost diffluent, but it gradually increases in consistence, and acquires a reticular texture, containing serum in its meshes, and when squeezed between the fingers it is compared by Dr. Carswell to a mass of cobwebs moistened with water. Under the microscope it appears composed of a number of very thin transparent fibrils, running in a straight and parallel direction, and having numerous very minute molecules interspersed among

amongst them. These molecules, thro' their own vital forces, collect themselves into groups of nuclei, which become converted into cells, from which the future tissue is developed. The fibrin soon becomes permeated with blood vessels, which convey the materials for the future nutrition and growth of the tissue into which it is converted: and there are, most probably, formed as in the embryo by the development of cells which open into each other, in continuous lines. The time within which recently effused fibrin may acquire vascularity, varies according to the vigor of the constitution: Sir. E. Home relates a case in which some lymph, effused on the surface of the peritoneum became vascular within 29 hours; but in feeble habits, it may require some days.

It may be exuded by itself, separate from the serum: but more commonly with the serum, in the form of liquor sanguinis, or coagulating lymph: the latter term denoting its peculiar property of assuming the solid form by coagulation. When extra-vascular. It is the result of a higher degree of action than the purely serous effusion: and may be regarded as the characteristic product, of the second stage, of the Inflam. process. Active Congestion.

Fibrin appears capable of being converted into almost any of the tissues of the body; the conversion in any particular case being determined by the surface from which the fibrin was effused, or by the function it is made to perform. Thus, if a bone be broken, or if the effused fibrin will be converted into bone. If a bone die, or is abstracted, still the lymph effused from the surrounding parts, from bone, muscle, fascia, cellular tissue, indiscriminately will become bone. If (as in the case of unreduced dislocation) the lymph is subject to frequent motion, part of it will be converted into bone, and part into ligament, so as to form a new joint. But there are some tissues which cannot be replaced: and then the lymph which they secrete is transformed into some other tissue, which occupies a similar place in other animals. Thus, muscle cannot be formed anew; but, if divided, the uniting lymph will become ligament, or dense fascia-like cellular tissue, which occupies the place of many muscles in animals of inferior development.

It appears that almost all the <u>simple tissues</u> are capable, if divided, of being thus united by a tissue similar to themselves, and of being to a certain extent restored, if

particles abstracted. But complex organs, such as muscle or gland, do not enjoy this faculty.

All newly formed tissues possess certain common properties. They are less vascular and less endowed with vitality than the original; they are more prone to run into disease during states of constitutional cachexy; as for instance, in scurvy, old cicatrices have been known to break out afresh into ulcers, and old fractures to become disunited: and they are liable to shrink and become atrophied (which is especially the case with new cellular tissue) or even (as in the case of pleuritic and peritoneal adhesions) to disappear altogether. A case illustrative of this is recorded in Andral's Pathol. Anat. where in examining the body of a madman who had stabbed himself in the abdomen, fifteen different times during his life, the parts near the most recent wounds were found united by considerable false membranes: at the situation of some that were older, there were only a few thin cellular adhesions: whilst, at the oldest there was no trace of adhesion of false membrane whatever. Vol. I p. 486

Serous membranes are very liable to adhesive inflm: mucous membranes quite the reverse, affording us another illustration of the wisdom

of the unerring hand of Nature, as were left to the care, we should be constantly in danger of having the mucous outlets to the body closed by the slightest attack of Inflt: but if two abraded and inflamed mucous surfaces are placed in apposition and left undisturbed, they may sometimes adhere — as sometimes happens in the vagina of female children; in the os uteri and Fallopian tubes of prostitutes and in the ureters, and biliary ducts when abraded by the passage of calculi.

When adhesion occurs for the normal purpose of reparation after injury, and proceeds favorably, it is attended with a very slight amount of Inflt. action, with no pain, and no heat; its feeb. If there be more than a certain degree of excitement, the lymph effused will be broken up by fresh exudations pus will be formed and the process of reparation must be commenced anew by means of granulations or, as it was formerly called union by the second intention. Hence Dr. Macartney and others have denied that adhesion is an inflam. process at all. The process, however, is essentialy the same — namely, increased attraction of blood, and exudation of lymph, which becomes organized whether accompanied with sensible pain

and heat, or not.

The effusion of fibrin may take place on the surface of a part: as on a serous membrane, or on the margins of a wound. On coagulation, the serous portion trickles away: the fibrinous remaining, in the form either of a continuous film, or of masses more or less detached, at first transparent, afterwards becoming yellowish, and somewhat opaque. Should the action now subside, the absorbents find the effusion quite amenable to their renewed play; and they remove it. But if the action persist, and yet not have reached the inflammatory crisis, absorption does not take place, and an opportunity is given for organization of the deposit. The fibrinous mass or layer separates to form the rudiments of organic structure: viz, fibrils and exudation corpuscles; according to the general law to which such fibrin is obedient, that, when effused from, and remaining in contact with a living texture not that inflamed, it has a strong tendency toward self-organization, assuming the simple structure of fibro-cellular tissue. It is consequently termed plastic or euplastic according to the facility and efficiency with which such structure is assumed. The fibrils, sometimes parallel, usually cross each other

in varying directions, forming an interlacement, in the meshes of which are the corpuscles. These latter are, at first, an aggregation of granules and molecules, in detached forms, termed "exudation corpuscles" subsequently they change into the form of the rudimental cell, with central nucleus. Perhaps the action now subsides: and still the effusion is liable to be absorbed: but it is probable that, preceding to absorption, and auxiliary to that process, the organic formation is undone, and the fibrin reduced to a fluid or semifluid consistence, as in the ordinary absorption of decayed original texture.

Failing absorption, and the action proving still short of True Pus, the organic arrangement remains, the basis of a new texture. Accordingly the process of vascularization is commenced. Blood corpuscles are seen chasing each other thro' the plasma, in new bloodvessels, coming from, and again returning by, the vessels of the adjacent original texture. According to some, these new vessels are, as it were, self formed in the plasma. Nucleated cells arrange themselves linearly, elongate, and communicate with each other by decadence of the opposite surfaces: and the central nuclei first oscillate in the channel or tube thus formed, and then, receiving an

undeniable impetus à tergo, by the heart's action, they push onwards, and enter the general circulation, their place being supplied by blood corpuscles escaped from the adjacent capillaries. Thus a canal is formed, continuous with original bloodvessels on either aspect, and circulation established within it. Or, according to others, blood corpuscles escape, few in number, from the adjacent original vessels — oscillate in the plasma — then push a-cross and join the return veins: and a new canal having been thus opened up, then first corpuscles are succeeded by others in a continuous stream, insuring the patency of the canal, and establishing its circulation. And from such parent canal, divaricating tubes of a similar kind are channelled out by a similar process. Both theories may be true: new vessels may be formed, now in the one way, now in the other. To us, however, as practical surgeons, the question is of comparatively little moment; and I have exposed them to your view, only that you might possess all the information of the day upon this very interesting subject. In whichever way formed, the new capillaries are at first anomalously capacious, larger than the vessels which supply them, they are afterwards contracted by the for

formation of a basement membrane lined with epithelium.

Thus far advanced — endued with an organic arrangement, and supplied with blood-vessels, in which blood is actively circulating; the plasma is capable of now assuming a higher degree of organization, and in due time comes to resemble the original texture (with some exceptions) from which it was effused, a process of change mainly attributable to transformation of the nucleated cells. Be it remembered, however, that this process is incompatible with the co-existence of true Inf. as I understand it. Whenever this occurs, the fibrin is aplastic: it never reaches higher in the range of organization than the exudation corpuscle: thence degenerating into the pus globule, it is associated with the serum of the liquor sanguinis from which it had just separated, to constitute purulent matter. And such degeneration will be continued so long as true Inf. persists. It is only after subsidence from the true Inf. acme that some of the fibrin becomes organized — as in the case of granulation — a portion, only, instead of all being wasted in the shape of pus.

True inf. however, may be, and usually is, surrounded, by a less degree of action, giving

to plastic fibrinous effusion; and hence we find, the purulent formation encircled and happily limited, by a barrier of fibrin more or less advanced in organization. But should the action disregard that barrier, establishing itself where active congestion only hitherto had been, the fibrin ceases to be plastic: and besides, that which had been previously effused to constitute the barrier, has its advancing organization, not only arrested, but broken up and undone.

Fibrin, more or less plastic, effused on the free surface of a membrane, is usually termed false membrane, assuming a structural arrangement, in the first instance, resembling that of the buffy coat of the blood, and forming a layer or coating somewhat similar to the original and inverted tissue; when accompanied by purulent or sero-purulent secretion, as it too frequently is — an indication of true Inflam. but when either alone, or attended by effusion simply serous, showing the presence of an amount of action short of that which is truly Inflammatory.

(b) Fibrin may be exuded in the interior of a part: and being at first fluid, insinuates itself so as to fill up every minute space, or

cascing enlargement: cohesion is gradually impaired. If the action be acute, the part is softened as well as swollen, a considerable proportion of serum being mingled with the fibrin; and on the exterior of the fibrinous range, is found a more extensive one of serum alone. If the action be slow and gradual, induration is found instead of softening: the serum having been absorbed, besides in all probability having been sparingly effused at first: the fibrin, also has had full time to assume the solid form, and is more or less advanced in organization.

If the action continue in a chronic and subdued form, the deposit becomes fully organized advascular: and being now little amenable to absorption, a serious change, more or less permanent, is thus effected in the structure of the part: it is indurated thickened and enlarged. And should such action persist, causing continuance of plastic deposit in greater abundance than absorption can normally control, the enlargement and change of structure proceed increase, giving rise to the simplest form of tumour. The action ceasing, so does redundancy of deposit: the absorbents then busy themselves in attempts to clear away what has been already heaped up, and in this good

work, they may be often materially assisted from without, by the judicious hand of the skilful surgeon.

(c) The effusion may be both on the surface and in the interior: for instance, into the tissue, and on the exterior of a serous membrane or, on the surface of such membrane, and into the parenchyma which it invests. This result is a combination of the two changes just described.

Thus we see that fibrin, effused during the inf. process, undergoes various changes according to the grade of action by which it is accompanied. It may be absorbed, and resolution follows. Or it remains and becomes organized: by persistence of the first stage of action or of the second in a subdued form. Or it degenerates to form pus, the true inf. crisis having been attained.

Inf. having been reached, organization ceases: on the subsidence of the action to a minor grade, it may again advance. But to all fibrin so organized, a general rule seems applicable, viz, that it is of low or imperfect organism, and, by consequence, liable to destruction in one of two ways; either by simple absorption, or subsidence of all permitted vascular action, or by a secondary accession

of such action advancing to suppuration and ulceration. This is favorable, as regards the discussion or disintegration of simple enlargements of inflam. origin. Unfavorable, as regards separation of solutions of continuity; and hence it is that the cicatrix by granulation – a process always preceded by true inflam. is often undone, and the wound made gaping as before, while union by adhesion, or by the slow "modelling process" into whole composition true inflam. does not, and cannot enter. remains pain and enduring.

It is only, then, the non-inflammatory exudation of fibrin which is thoroughly eupluastic. By it wounds unite, bones knit, and arteries are consolidated. The salutary processes are wholly incompatible with true inflam: and often are but ill performed after its subsidence.

Inflam. is essential, or indeed useful, towards separation, only when the liquor sanguinis by reason of debility in the part, is deficient in fibrin: as in an old and indolent ulcer. An invariable effect of the inflam. process, is known to be an augmentation of that plastic substance. It with owing an additional and probably sufficient amount of reparative material to the part, therein before defective

but such fibrin is not capable of due expansive application, until the action which caused it has subsided from the true inflammatory crisis. Even then, organization proceeds at a disadvantage; but organizable fibrin of the second class — that, unconnected with true Inflm. being of the first — is better than none at all.

Suppuration is, when resolution does not ensue, the suitable termination of Inflm. and if that be severe, it appears the natural result: therefore a fully developed simple Inflm. is termed, by some suppurative Inflm. The pus is secreted thro' the nucleus of the capillary vessels, not however immediately as such, but is first formed by the changes which the inflam. exudation undergoes; the coagulated fibrin is gradually converted into pus globules, which then mix with the serum. Pus is formed of all the components of the blood, the coloring matter excepted, and especially from its albumen and fibrin. If it collect in the cellular tissue, Abscess is produced. The process of suppuration is a true secretion, and the vital conditions of the organs, influence it as well as other secretions. There is usually no destruction of tissues connected with suppuration. That we often find the remnants of destroyed cellular tissue in pus, or that the skin covering the

abscess is destroyed depends on accidental circumstances — in the great distention of the cellular tissue and skin: or in the suppuration from general or local mischief passing into ulceration. These remnants of destroyed cellular tissue must not be confounded with the cores, so called sloughs, which are formed in the midst of the inft. cellular tissue at the commencement of suppuration, in the form of white jelly-like semi-transparent stringy flocks, which have no trace of organization, are at first firmly connected with the surrounding cellular tissue, but subsequently are thrown out with the pus. These cores are tough concretions of coagulated albumen.

The transition of inft. into suppuration is probable, when the inft. is active, and quickly reaches an acute stage: when the pain is severe, the distention and swelling considerable, the inflamed part of a lax character, and surrounded with much cellular tissue. If the inft. continue longer than usual, without showing critical movements, if the pain becomes throbbing, the redness and heat diminish without entirely disappearing, the swelling becomes softer, and the patient has a shiver, then the formation of pus has commenced: the swelling becomes

The tissue, is elevated in the middle, and dark at its circumference, and on touching it, fluctuation is felt. In order to be assured of this the fingers may be pressed alternately upon the swelling, or, what is preferable, the finger, or the flat hand may be laid on one side of the swelling, while this is gently tapped with the fingers of the other, by which the undulations of the pus are communicated to the hand. The skin becomes transparent at the most elevated part, and the pus is seen thro' it: finally the skin breaks, by the process of continued absorption, and the pus is discharged. If the parts covering the abscess are unyielding, an extension of the suppuration takes place in various directions before it makes its way out. If the tissue be slight it often continues a long time, without any disposition to break. It is often very difficult to distinguish the transition to suppuration in tissue of deeply seated or of internal organs. The usual appearances are — the symptoms of tissue subside without crisis, the part does not return to its natural function, it feels to the patient heavy, oppressive, or cold, he has frequent shivering; the appearances of hectic fever set in, burning heat of the hands and soles of the feet, especially after eating; circumscribed redness of the cheeks.

emaciation, night sweats, hurying and so on. Deep seated fluctuation is felt, or the surface of the part exhibits an œdematous swelling. The symptoms of hectic fever accompany every considerable suppuration, and it is probable that this must be ascribed partly to the loss of the albumen and fibrin of the blood, and partly to the absorption of pus.

Hectic fever is a form of constitutional irritation, widely different from the inflam. type, and may be produced by other circumstances than mere suppuration. Its general character is decidedly remittent, and its ordinary symptoms are, a general paleness of the surface, excepting the cheeks, on which there is usually a delicate and circumscribed bloom; beautiful, yet a thrilling by morbid indication. The appetite is resumed, and sometimes apparently digestion also: the former is sometimes inordinate: but yet emaciation sets in and advances, sometimes with great rapidity. The tongue is preternaturally clean, especially at the tip and edges: at first moist, but ultimately becoming dry and glazed, and perhaps studded with aphthæ. The condition of the bowels varies, but constipation usually predominates, until the fever is extreme has been attained, when obstinate diarrhœa, termed colliquative, is established.

There is thirst: and burning heat is much complained of in the chest, soles of the feet and palms of the hands: the general skin at the commencement is both dry and warm, but soon shows a tendency to profuse perspiration, totally ineffectual however in removing the disease. Respiration is rapid and short, and readily accelerated. The pulse is frequent, small and sometimes hard; and also readily affected by exercise or emotion. At two periods of the day, noon and evening, there is an exacerbation of all the febrile symptoms preceded by chills, and followed by perspiration. Perspiration is most profuse towards morning, and may then be regarded as a resolution of the evening's exacerbation. The urine varies, sometimes scanty and high colored, more frequently copious and pale. The eyes tho' sunk in hollow orbits are usually bright and intelligent. The lower extremities become swollen. The sleep is disturbed and unrefreshing and there is a continual feeling of lassitude and debility; but with all this failing of the physical powers, the mind remains cheerful and unclouded to the last, and seems to gather fresh hope from the very causes of despair.

May I here ask your indulgence for introducing, from one of the modern works of fiction the following beautiful description of death by

this disease." But there were times — and often too — when the sunken eye was too bright, the hollow cheek too flushed, the breath too thick and heavy in its course, the frame too feeble and exhausted, to escape their regard and notice. There is a dread disease which so prepares its victims, as it were, for death: which so refines it of its grosser aspect, and throws around familiar looks unearthly indications of the coming change — a dread disease, in which the struggle between soul and body is so gradual, quiet and solemn, and the result so sure, that day by day, and grain by grain, the mortal part wastes and withers away, so that the spirit grows lightly and sanguine with its lightening load: and feeling immortality at hand, deems it but a new term of mortal life — a disease in which life and death are so strangely blended, that death takes the glow and hue of life, and life the gaunt and grisly form of death!

Such is the fever, strongly marked, and advancing to a fatal termination: but of course it is found to vary in duration, intensity and issue, according to the nature of the disease which calls it forth. On removal of the cause recovery is often extremely rapid.

Hectic fever may be caused by any chronic, or organic incurable disease. whether incurable from its nature, as Scirrhus or tubercle; from its extent, or from constitutional debility: also exhausting from profuse suppuration — or from any other great and continued discharge, as prolonged lactation leucorrhœa and so forth. Hectic is so frequently caused by profuse suppuration, that an absorption of pus was formerly deemed its invariable and sufficient cause. Hunter denied this theory. 1st because hectic may arise from organic disease; or from excessive discharge of any secretion, where there is no suppuration. 2dly because pus may be absorbed (as it often is from chronic abscesses and buboes, which are discussed without being opened) without the production of hectic. It is certain therefore that absorption of pus is not the only cause of hectic. But it is equally certain that pus or its constituent elements at least, are absorbed from extensive suppurating surfaces and it is probable that its presence in the blood adds to the hectic and constitutional debility, and that (especially if it be vitiated or decomposed) it tends greatly to the production of colliquative diarrhœa and ulceration of the intestines. For the injection of pus or putrid matter in the blood almost invariably causes diarrhœa

The indications in the treatment are (1) to remove the local cause: or (2) if that be impracticable to enable the system to support it.

The first indication may often be fulfilled by an amputation or other operation; as it is well known that hectic patients often bear operations extremely well, recovering from them rapidly, and making but one step, as it were, from death's door, to perfect health; and in the language of John Hunter "the removal of a diseased part which the constitution has become accustomed to and which is rather pitting the constitution, is adding less violence than the removal of a sound part in harmony with the whole." In cases not admitting or requiring an operation, local mischief must be remedied; as purulent discharges retained as long as possible.

As for the second indication, the strength must be maintained by giving as much food as the stomach can digest with comfort: but the quantity of animal food and of fermented liquors must not be large enough to add to the excitement, or increase the heat of skin, thirst and perspiration. Arrowroot, and other farinaceous preparations, jellies, Iceland and Irish moss, are useful as mild nutritives occasionally, when there is an excess of heat and fever

but these articles should not be given at such times or in such quantities as to interfere with the digestion of more solid food, if there is an appetite for it. Tonics may be given to support the strength, such as bark, quinine, or Cascarilla: or sometimes the preparations of iron; but if, at any time in the varying progress of the disease, excitement appears to prevail, the pulse being more accelerated, and pain aggravated, tonics and animal food must for a time be changed for saline medicines and farinaceous or milk diet. Digitalis, or Remedy must chosen in hectic, may be of service at such times, if given in few moderate doses, for not too long a time. Ten minims in a saline draught at bed time, is the proper dose. Opiates must be given to procure sleep and allay pain. Change of air is always advantageous. Profuse perspiration may be checked by diluted sulphuric or nitric acid, by tonics and by tepid sponging. As it will be recollected that the diarrhœa often depends often depends on an inflamed or ulcerated condition of the intestinal mucous membrane, reason will suggest, that attempts to stop it by purgative, and large doses of stimulants and astringents, will often be, not only unavailing, but write

ting, and mischievous, altho' good in cases of mere debility. If therefore the diarrhœa is attended with tenderness, much pain, and tenesmus, the proper remedies are, rest in bed, mustard poultices to the abdomen: the very mildest of diet of milk, arrowroot etc. enemata of starch containing from 20 to 60 minims of laudanum. Dover's powder at bed time, and chalk mixture during the day: and one or two grains of blue pill, with three or four of Rhubarb occasionally if the liver is inactive. It may be added that copious injections of warm water give great relief in diarrhœa: nothing the irritated mucous membranes washing away acrid secretions, and enabling the patient to pass easily at once, what would otherwise occasion several painful efforts.

When pus is formed rapidly after the onset of infl. and diffused into the surrounding textures, from want of antecedent protective condensation of fibrine, the injury, as already stated is great: by, infil hæmorrhagic disintegration and gangrene. The constitutional symptoms attendant thereon, are not those of Hectic, but of Irritative Fever (~~[illegible]~~ called symptomatic Typhoid), a condition, as it were, intermediate, between the hectic and full inflammatory, combining some of the characters of each in the past, the advancing destruction

of tetanus is preceded by spreading pain of a rapid and intense kind; the action tends to rouse the system, whilst its result or tetanus has directly the contrary effect. Such being the compound nature of the local mischief, it need not surprise us to find the general disorder, to which it gives rise, consisting of febrile excitement, modified and overborne by depression of the vital powers. The pulse is frequent and hard: at first with indication of strength but soon betokening manifest debility. The tongue is usually tremulous, and covered with a thick, dark-colored, offensive fur; moisture gradually leaves it, and it ultimately becomes hard, brown and dry. The urine is scanty, high colored, and of unpleasant odor; sometimes apparently suppressed. Sometimes there is diarrhoea sometimes constipation. Rigors are frequent, followed by perspiration, usually profuse. There is great restlessness, with agitation of manner, anxiety of expression, and pinching of the features: the eyes look dull, glassy and sunken: the patient lies on his back, and sinks towards the foot of the bed. The abdomen is tightly distended with flatus, and the sphincter is relaxed, so that the stools are passed involuntarily, the patient dozes imperfectly, awaking with a start, he picks

imaginary objects on the bed clothes and mutters to himself. There is starting or twitching of the tendons, at last the skin becomes cold and clammy, respiration is hurried and sighing, and there is a sensation of oppression at the chest. The mind is either greatly depressed, or excited by occasional delirium. The strength is much prostrated, his eyes sink in, and fatal collapse is imminent. If recovery occurs the first sign of amendment is diminution of the frequency, and increase of the firmness of the pulse, with sound sleep: the patient being sensible and composed, the eyes brighter, the tongue cleaning, and above all, suppuration returning, if there be a wound.

The prognosis will of course be always doubtful: but there may be a chance of recovery, if the cause is of recent existence, and admits of its removal by operation or otherwise: which there can be scarcely any, if the constitution has been exhausted by its long continuance. Thus, if this fever comes on in erysipelas or smallpox, diseases of no long continuance, the constitution may rally — or, if it be caused by a recent injury, or by extravasation of urine, it may be removed perhaps by an amputation, or incisions in the perinæum, but it will scarcely be cured if caused by chronic abscess

Prognosis

or disease of a joint, and preceded by hectic. And thus, if the hectic has been suffered to pass into the typhoid state, the season of amputation and hope of recovery are past. "It is" says Hunter "the more incurable, as it is more connected with the past than with the present."

The indications are to remove the cause, allay irritation, and support the strength. If the removal of the cause by operation by operation is likely to be successful, upon the principles just laid down, it should be done without delay; and, even if not, it may be better to try a doubtful remedy than none at all. Treat.nt

As for the general treatment, opium or some of its preparations should be given in such doses, repeated frequently, or in a large dose at once, according to the judgment of the practitioner, for the relief of restlessness and delirium. The strength must be supported by generous and tonics: by wine and other stimulants and by moderate quantities of milk, beef-tea, arrowroot etc. if the patient can take them. Diarrhoea is best relieved by a teaspoonful of Spts. Aether. Sulph. Comp. (Hoffman's Anodyne) and flatulence by an enema of turpentine. The catheter should always be used, if the patient cannot pass

his water: a point that should always be inquired into.

The circumscription of the pus in the cavity of the abscess depends upon the effusion and coagulation of the plastic lymph, which occur during Inft. whereby a cavity with smooth walls is produced, in which the capillary vessels are very strongly developed, so that the pus is shut off from the other cellular tissue, and its spreading from cell to cell is prevented. In cases in which the Inft. is not connected with plastic exudation this circumscription of the abscess does not take place; for instance in many exspectatous Infs. If suppuration occur on the surface of serous membranes, there must always be first produced a considerable development of vessels. In structures which are highly vascular, suppuration occurs more rapidly.

The walls of the abscess must be considered as secreting and absorbing surfaces. In the resorption of pus (by the veins and lymphatics) it is mixed with the blood, and separated from it by the colatories of the body, especially the lungs and kidneys, or is developed in the tissue of parts, (forming metastatic abscess); it is, however, undetermined whether the pus is deposited as such, or is produced by the after changes, which com.

monly occur in the inflam. exudation. As the pus corpuscles are larger than those of the blood, they cannot pass thro' the capillary vessels, and therefore only the serum of the pus is absorbed, or the pus corpuscles are broken down, and can then also be absorbed. We must not confound with this, the entry of pus into a torn vein, or its formation by phlebitis in a vein, and its further passage onward with the blood. Bonnet supposes that the absorption of good cream like pus, which has not been changed by the action of the air, will not produce any peculiar symptoms, because, with it, nothing enters into the blood, but what is natural to it; but if, in depraved putrid pus, hydrosulphate of ammonia be developed with a residue of ammonia, and be absorbed with the serum or pus, a septic poison is introduced into the ~~blood~~ system the presence of which has been ascertained by Bonnet in the blood, and in its separation in the urine.

Of the circumstances upon which depends the determination of abscess to the surface I borrow the following very interesting description from John Hunter "An internal pressure, produced by an extraneous body, acts equally on every side of the surrounding parts, and, therefore, every part being pressed alike, ought from the cause alone to produce absorption of the surrounding

parts equally on all sides, supposing the parts themselves similar in structure, or, which is the same, equally susceptible of being absorbed; but we find that one side only of the surrounding living parts is susceptible of this irritation; therefore one side only is absorbed, and this is always the side which is next to the external surface of the body. From this cause we find abscesses, etc. whose seat is in or near the centre of a part, readily determined to the surface on the one side, and not on the other; and, wherever the lead is once taken, it immediately goes on." He also observes "We find that the absorption of whole parts more readily takes place, to allow an exhaustion substance pass out of the body, than it will to allow one to pass in. Thus we see that the slight pressure produced by matter on the inside of an abscess has a great effect, and the matter is brought much farther to the skin (altho' very deep) than it would by the same quantity of pressure applied from without: and, indeed, so slight a pressure from without would rather tend to have an opposite effect, namely, that of thickening. The reason of this is evident; one is, a readiness of the parts to be freed from a disease already existing: the other is, is a backwardness in the parts to admit a disease. This

principle, therefore, in the animal economy, produces one of the most curious phenomena in the whole process of ulceration, viz; the susceptibility which the parts lying between an extraneous body, and the skin have to ulcerate, while all the other side of the abscess is not irritated to ulceration: and the necessity there is, that it should be so is very striking: for, if ulceration went on equally on all sides of an abscess, it must increase to an enormous size, and too great a quantity of our solids must necessarily be destroyed. Mr. Travers in commenting upon this point observes "Whether the tendency of matter to the nearest surface, external or internal, the outer or inner integument, as the case may be, is due to the more yielding structure of parts in the direction of the nearest surface or to the operation of a physical law, as the increased amount of pressure for the increased area of the summit over the base, I cannot determine".

Healthy Pus. Pure good pus is a yellowish white, opaque fluid, of the consistence of cream, with a peculiar smell when fresh which it loses on cooling; specifically heavier than water (Sp. gr. 1.030), insoluble, tho' freely miscible with it, not readily subject to putrefaction, reacts Pus

in its fresh state as an alkali: but after a time is neutral or acid, probably because during its decomposition it forms acetic acid. Like many other animal fluids, it consists of a thin serum holding a number of globules in suspension from which it derives its color and opacity, and which can be separated by straining, but very frequently this separation occurs spontaneously, if the pus be left alone.

The purpose which the formation of pus serves in the economy is, says Travers, in conjunction with another act of Infl. to open a communication with a contiguous surface, either for the purpose of liberating matter incapable of organization, and therefore superfluous or hurtful: or as indispensable to reconstruction or the effacement of lesions by granulation. The continuance of Infl. beyond the term required for union in simple solutions of continuity, in cases which are beyond separation by the direct adhesive process, and in phlegmon or cohesive deposit unaccompanied by external lesion, entails and addition of the suppurative to the adhesive action.

With reference to the putrefaction of pus, Hunter observes, that from several circumstances often attending it, it would appear in general

to have a greater tendency to putrefaction than the natural juices have: but I very much suspect that this is not really the case with pure pus, for when it is first discharged from an abscess it is perfectly sweet. There are, however, some exceptions to this, but these depend on circumstances entirely foreign to the nature of pus itself: as, for example, the communication of the air, with the interior of an abscess: the nearness of an abscess to the fecalent contents of the colon or rectum, when blood is contained in an abscess resulting from external injury, or when part of the bones mortify from the same cause, and the like; in all such circumstances we find that the pus has a greater tendency to putrify than the pure or true pus, which altho' easily rendered susceptible of change by extraneous additions, is, in its own nature pretty uniform and immutable. It appears so unchangeable that we find it retained in an abscess for weeks, without having undergone any change, but these qualities belong only to perfect pus. Pus from bones, he remarks, is subject to the same changes under similar circumstances. Mr. Gulliver also states that he has had healthy pus in a window, to which the sun had access, for six weeks, without becoming fetid, and if, carefully washed of all

impurities, it will continue sweet for almost an indefinite time.

Chem: Analysis. The most recent analyses, especially those of Donné of Lyons, Gueterbock, and Davy, show that pus contains 86.1 pr ct of water; 1.6 fat soluble in alcohol; 4.3 fat and osmazome soluble in cold alcohol, and 7.4 albumen, and the matter of the globules soluble in neither hot or cold alcohol. The substance of which the globules are composed has received the name of Pyine: but it seems to differ very little from fibrin. Pus also contains about .8 pr. ct of salts, chiefly common salt, and muriate of ammonia, and perhaps a faint trace of sugar. Chem Anal.

The fluid or serum of pus shows no trace of globules; it exhibits all the signs of albumen dissolved in water, which is distinguishes, like the serum of the blood, from the white of a fowl's egg, in not being thrown by ether. This fluid contains fat, osmazome, acetic acid, perhaps also, lactic acid, hydrochlorate of soda, of potash, of lime, of ammonia, phosphate, sulphate and probably also acetate and lactate of soda, phosphate of magnesia and lime, and a trace of iron and silica.

The globules of pus vary in quantity, some times a larger, sometimes a smaller number being

present: the thicker and better the pus, the more numerous are the globules. When examined under the microscope they are found to be opaque spherical globules, apparently granulated like mulberries, but in reality smooth, as may be found by examining their circumference. They vary from 1/5000 to 1/2000 of an inch in diameter: some even are much larger, especially if they proceed from a surface that is actively inflamed. They consist of an envelope or cell-membrane containing nuclei, oil globules and minute granules. If acetic acid be added, it brings clearly into view, two three or four nuclei, and renders the other parts transparent, or so invisible that they seem to have dissolved. They are not really dissolved, however, because the nuclei retain their adhesion to each other, and because, if liquor potassæ be added, the original appearance is restored. If kept till putrefaction is commencing or if treated with a much quantity of liquor potassæ, the oil globules become extremely distinct, but too much either of the alkali or of decomposition, dissolves the outer envelope.

Besides the globules other matter albuminous molecules are also formed in pus in great abundance of the same nature apparently as

the central molecules of the globules.

"Pus I believe" says Mr. Travers "to obtain its characters of consistency, opacity and color after exudation, and to consist of the superfluous or waste lymph which has been separated during the adhesive stage from the mass of blood held in solution by the serum, being thus a chemical modification of the constituents of the liquor sanguinis: in short, the latter fluid deprived of its original character, and property of spontaneous coagulation. Pus particles resemble those of lymph seen in the vessels under high, except that they appear broken down and partly dissolved in their texture instead of being compact and of less regular figure: and, if when suspended in a drop of fluid compared with the elastic blood corpuscle, to which they bear no analogy whatever utterly inert and devitalized. We never see pus in the bloodvessels but in fatal phlebitis, and if introduced into the circulation by injection, it is destructive to life. Although, therefore, a clean wiped granulating surface soon presents a covering of pus, it is regarded as a colorless fluid of a more dense and unctuous consistence than serum. Its appearance is simultaneous with the disappearance of the lymph particle from the veins, the suppurative action being determined, or, in other words,

the separation of the proper lymph-particle put an end to by its sufficient deposit in granulation, and the inflammatory issues state preventing from the continuance of the irritation, for no imperfect state can be perpetuated: the superabundant lymph particle, at no time colored, along with the permanent fluid or serum of the blood, is strained off through the pencils, forming the terminal loops of the granulation. Thus is obtained the twofold purpose of relief to the loaded capillary circulation, and a bland and homogeneous protecting fluid for the granulation during the period of its growth up to that of final organization. When the rudimental fibrin is no longer needed for the new structure, it is used, as in nature all remnants are, for a new but no less important purpose — the preservation of that structure. Pus is as necessary to the maintenance of a granulation as lymph was to its formation: but a change is necessary to fit it for its new function, and this is provided for by a new arrangement of a new action of the secreting capillaries, and a chemical change, which destroys its vital property and amalgamates the separated lymph globules with the serum of the blood. The precedence of adhesive to suppurative action is sufficient to render presumable a necessary con

nexion between the lymph separated during the first process, and afterwards disappearing, and to explain the invariableness of this relation in the order of their appearance. There is no analogy between the effusions of serum or of liquor sanguinis incidental to primary wound or injury of any kind and pus; yet the ingredients of the two latter are the same; it is by the combinations of a vital chemistry that their appearance and sensible properties differ, and this we are capable of imitating. If this theory be admitted, it will explain the appearance of pus in the absence of the especial granular structure or distinct hypogenic membrane, as seen upon mucous, serous, and synovial surfaces and canals; and, even in the absence of febrinous ~~[illegible]~~ exudation, as in certain modes of Infl. where the habit of the parts or the character of the Infl. renders them incapable of carrying on the adhesive action, or that action is by violence interrupted. Purulent mucus, muco-purulent secretion are terms in common use, indicating the transition stage witnessed in these cases; so also the modifications of color, consistence and purity - are explained, which are conveyed by the terms sanious, flaky, or whey like, ichorous, etc. and the

improvement of the secretion by elaboration from that of fistulæ and sinuses to the "Pus laudabile" of old authors concurrent with the improved vitality of the granulations, meaning a fuller proportion of the lymph particle to the serum, and vice versâ, its degeneration in enfeebled and sinking states of the system. Thus also is explained the effect of inordinate and excessive suppuration to superinduce hectic, from the excessive withdrawal of that ingredient which forms the nutrient and restoring principle of the blood.

Pus, as we have described it – the result of vital action – is of normal character, and is usually termed, healthy or laudable (pus bonum et laudabile). But various circumstances may cause deviation from this, and also coagulated blood, undergoing a peculiar process of decomposition, becomes liquid, and this fluid closely resembles pus in appearance, but the researches of Mr. Gulliver have clearly shown that it is not true pus, only its counterfeit.

II Serous Pus is thin, almost transparent and yellowish or reddish. It differs from the former in containing very little fatty matter, or fibrinous globules, and in being the product of a low degree of Inflm. in weak constitutions.

III Clotty or Curdy Pus resembles the serous, but has numerous white clots and flocculi of coagulated fibrin floating in it. Under the microscope it displays the globules of healthy pus, and numerous other particles of irregular shape. It contains very little fatty matter, and is commonly found in scrofulous abscesses.

IV Mucous Pus or Mucopurulent Matter. The mucus which proceeds from healthy mucous membranes is seen under the microscope to be composed of abraded epithelium cells, flat irregularly five sided and with a central nucleus; with numerous granular masses, and a few spherical bodies very much like pus corpuscles, except that they contain much fewer oil globules, and those are suspended in a viscid ductile fluid. Under Chyl. there is an increased exudation of albuminous fluid: the epithelium cells are perhaps shed more quickly, before they are flattened out: the quantity of globules is greatly increased, and they acquire the exact character of pus globules. The once much agitated question of the diagnosis between pus and mucus, is one of those that belong to a bygone pathology. Mucopurulent matter is pus, only mixed perhaps with epithelium, or modified chemically by varying local conditions - the contact of urine

for instance.

A very viscid pus-like mucus is occasionally formed in chronic abscesses, containing a large quantity of hydrochlorate of ammonia — a salt which abounds in unhealthy pus.

V Concrete or Cardaceous pus; may either consist of common pus, thickened by the absorption of its watery parts, in consequence of having remained for a long time in a chronic abscess or bony cavity — as the antrum or nasal sinuses — or it may be originally secreted in a thick condition, and in this latter case differs little or nothing from the meliceros and atheromatous ~~[illegible]~~ matter found in wens or other encysted tumours.

VI Putrid Pus has a fetid smell, and alkaline reaction, in consequence of the presence of hydro sulphate of ammonia, which is formed by the decomposition of albumen, when pus is exposed long enough to air and heat.

VII Specific Pus, capable of producing the venereal or vaccine disease, or the smallpox, may not differ in its sensible qualities from the healthiest, but must include some matter in a state of decomposition: which state is capable of being imparted to other fixing matter.

VIII The pus from spreading ulcers and cancers is thin and serous, containing blood globules and

shreds and debris of the ulcerating tissues. It is said to be ichorous when thin and acrid; sanious when thin and bloody, and purulent when mingled with dark half curdled blood.

Ramollissement. This is a peculiar effect of Inflm. which is often observed in greatest perfection in the brain and spinal chord, portions of which have become soft, pulpy, and at last affluent like thick cream. It has been shown conclusively by Dr. Hughes Bennett of Edinburgh that this process is a mere variation from the ordinary course of suppuration. The affected tissue is first infiltrated with fibrine, which coagulates in the form of granules which may be seen coating the vessels, and filling up all the space between the ultimate tissue of the organ. Thus the organ affected is rendered perfectly dense or hepatized. The granules next form themselves into nucleated cells (exudation corpuscles) which after a time break up and are disintegrated: and on examining the softened mass with a microscope, it is seen to consist of a mass of granules either diffused or amalgamated in masses, or contained in nucleated cells, and mixed with the debris of the softened tissue.

Pus in the Blood. There is a peculiar state of the system sometimes called the suppurative or

purulent diathesis, in which abscesses form in rapid succession in the liver, lungs, joints or other parts of the body: and this diathesis generally accompanies some disease such as erysipelas, or puerperal fever, in which there is great irritation of the blood, and also a profuse formation of pus. It is most common in consequence of phlebitis, in which disease the purulent or other diseased secretions from the lining of the veins is mingled with the whole mass of circulating blood.

One peculiarity of these local suppurations is the extreme rapidity with which they often form; insomuch, that authors have denied that the pus can be elaborated in consequence of inflm. at the parts where they are found: but have considered them to be deposits of pus, which have been absorbed into the circulation from some other part, hence they have been commonly called purulent depôts, or consecutive or metastatic abscesses.

But, altho' it is very possible that pus, if present in the blood, might be deposited in the lungs or liver (because we know that quicksilver when injected into the blood is quickly found in those parts) still it is very certain that consecutive abscesses are not universally caused by a deposit of pus into an inflamed part. For abscesses of the liver often follow injuries of

the head, and other consecutive abscesses some times follow other injuries, which do not give rise to any suppuration, and from which, consequently, there is no pus to be absorbed.

Again, it appears certain that after abscess in the liver, large quantities of pus find their way into the circulation, thro' veins which open by large orifices into the cavity of the abscess: and this pus is excreted by stool, urine, and vomiting, without the formation of consecutive abscesses. So that, at all events, healthy pus can pass thro' the system without occasioning any severe derangement: but if pus be taken into the blood which is vitiated or putrid, it will cause severe constitutional derangement and diarrhœa.

Abscess.

An abscess may be defined, a collection of pus in the substance of any part, or in a cavity, the limiting fibrinous deposit becoming more and more condensed, its central aspect ultimately assuming a membranous appearance and a membranous function: having a smooth villous surface, somewhat like the mucous, and possessing the power of maintaining the formation of pus: Hence it is termed the pyogenic membrane: endowed with very considerable powers of secretion

but as an absorbent surface comparatively feeble. There are two kinds of abscesses. I. The acute or phlegmonous. II The chronic, or cold; besides the diffused abscess, or diffused suppuration in the cellular tissue.

Acute abscess (which when occurring in the subcutaneous cellular tissue, is called phlegmon) commences with all the signs of acute inflammatory fever; severe throbbing pain; bright redness, and much swelling, firm in centre and oedematous around. The occurrence of suppuration is indicated by severe rigors, by an abatement of the fever, and a change in the pain, which is converted into a sense of weight and tension, with a pulsatory feel at each beat of the arteries. Then the tumour becomes softer, and loses its bright arterial color; and as the quantity of matter increases, its centre begins to point, that is, to project in a pyramidal form, the explanation of which is difficult; and, indeed, instead of attempting to assign any explicit reason for its occurrence, it is probably better simply to regard such outward tendency as a well known and admitted law of life. The progress is various; sometimes rapid, sometimes protracted and tedious; depending on the rate of fluid accumu- Symptoms

latin, and also on the nature of the intervening parts: if these are of a fibrous structure we know that they will long resist the ulcerative process, and consequently retard the progress of the pent up matter beneath — almost always injuriously. The ordinary fibro-cellular tissue gives way readily and rapidly, ultimately by the skin alone resists; this becomes attenuated, stretched, and completely deprived of its support for a certain space, — usually of no great extent for the abscess enlarges in a conical form, the apex towards the surface: the stretched and undermined portion sloughs, is quickly detached, and the aperture thus formed, admits of the pus being discharged.

As the matter becomes superficial, its existence is more and more plainly evidenced by what is termed fluctuation. The fingers are applied over the part, lightly; and either by alternate pressure, or by keeping one still while another is made to tap lightly on an opposite point, an impulse from the fluid is more or less distinctly perceived; the more superficial and copious the matter, the more marked the impulse. When, on the contrary, the pus, yet recent, is but scanty, and the super-imposed texture both thick and dense, the sensation imparted is obscure.

Acuteness of touch and experience are both required under such circumstances, to prevent mistake in diagnosis. The surgeon possesses of both, with the additional faculty of using them aright, is said to be endowed with the tactus eruditus a gift of rare value; perhaps partly innate, yet doubtless capable of being acquired by education both of the finger and the judgment. The adipose tissue when abundant and somewhat tense, has an elasticity which simulates somewhat closely the fluctuation of abscess. We must endeavour by frequent practice to learn to discriminate between the two sensations, and should opportunity offers never neglect to contrast the elasticity of the medullary tumor many examples of which imitate accumulation of fluid still more closely.

But the progress of matter is not always to the external or integumental surface; it may be to the mucous. By another law of life, as hard of explanation as the preceding, when the integument is either distant, or separated from the pus by dense fibrous texture, the ulcerative process takes place, not in that direction, but towards a mucous outlet, should that be in the vicinity. Serous membrane, fortunately, has no such attraction. It being fibrous, resists

the ulcerative process, as all such textures do. Thus when matter has formed immediately exterior to the peritoneum, in the abdominal parietes, it has fibrous texture on either as pouch, and the external is the more dense and unyielding. Yet so strong is the natural tendency outwards, when no convenient mucous surface is near, that in almost all such cases the outward progress is steadily maintained tho' the more dense, thick and unyielding investment, the peritoneum for at least some considerable time remaining entire, saving the cavity from dangerous purulent irruption. Whereas, when abscess has formed in the deep cellular tissue by the side of the rectum, very often, before it has pointed externally on the hip, it has made its way by an ulcerated aperture into the cavity of the bowel, and thence been discharged. And in the same way, abscess of the lung, or even of the pleura is more likely to be discharged thro' the bronchial tubes, than to make its way thro' the thoracic parietes. We cannot too much admire the wisdom of the arrangement by which important internal cavities are invested by such a tissue as effectually resists the inroad of advancing matter; while the mucous canals, for

municating, on the general surface, are calculated to receive and discharge the noxious formation.

Especially important tissues, the arterial, venous, and the nervous, may traverse the cavity of the abscess: or, tho' at first not implicated may be eventually exposed to the matter's contact by enlargement of the suppurated space. Again, by an effort of Nature, such parts are protected, at least for a time. They are encrusted by a fibrinous deposit, dense and compact, which, as it by itself bearing the brunt of the pressure occasioned by the accumulating fluid, saves the important part which it invests from ulcerative destruction. Only for a time, however, let it be remembered; for should the relieving incision be unwisely withheld, both the protector and protected are overborne, and the disasters of hæmorrhage, false aneurism, or mere destruction of the tissue with certainty ensue.

Granulation. The matter having been discharged, the cavity of the abscess contracts, the pellicle of lymph which lines it is cast off; and its surface becomes covered with numerous small, red, vascular eminences called <u>granulations</u>. These are formed by the effusion of lymph, part of which takes on vital organization, and becomes part of the living surface: part degenerates into pus,

If the restorative actions are vigorous the granulations will be numerous, but small and florid from containing many capillaries, whilst in the opposite state they will be large pale and flabby. And the pus from healthy granulations will be laudable and creamy — from the others thin and flakey.

Cicatrization. When the cavity has become filled up, by the growth and union of granulations, the red inflamed skin around its orifice is removed by ulceration, so that the margin of the sore become adherent and fixed; and then cicatrization begins. A white pellicle extends from the circumference, gradually covers the whole surface, and becomes organized into a new cutis and cuticle, termed a cicatrix. The cicatrix is at first thin and red, but soon becomes denser and paler than the original skin, and like all new textures is less vascular and less vitale. The coloring matter between the cutis and the cuticle is later in appearing. But this process is accompanied by two others, namely, the contraction of the surrounding skin, so that the surface to be healed is very much diminished before cicatrization commences, and the contraction of the cicatrix subsequently. The preliminary contraction of the skin, appears intended to diminish

the labor of an extensive separation: the subsequent contraction of the cicatrix is in conformity with a law explained when treating of Adhesion, and depends on the atrophy of the newly-formed subcutaneous cellular tissue. It is also greatest when the preceding granulations have been pale, flabby, and exuberant as in Burns.

But it is to be remarked that the filling up of a vacancy in the tissues, whether in consequence of accident, abscess, or ulceration, need not necessarily be attended with suppuration, nor with the peculiar appearance of granulations. On the contrary, if all irritation be subdued, and all irritation excluded the chasm may fill up with red lymph, which speedily cicatrizes. This is constantly observed after the flying injuries, they soon become covered with a scab formed of dried blood or lymph, under the protection of which they quickly cicatrize: and when it can be effected, larger wounds should be made to heal in the same way. This form of separation is called by Macartney the <u>modelling process</u>; and he contends that neither this process nor adhesion ought to be considered inflammatory, but rather processes of growth and nutrition.

Causes. Acute abscess is mostly idiopathic that is depends on constitutional causes, and is a frequent sequel of fevers — it may, however, be caused by blows, ecchymoses, or foreign bodies introduced into the skin or flesh.

Treatment. The indications to be fulfilled in the treatment of acute abscesses, are. 1st. To remove remaining inflam. It has already been stated, that, in the formation of matter, the action which caused it usually subsides spontaneously. If not, a few leeches or cups are to be applied in the neighbourhood, and the other antiphlogistics are to be continued. 2d. To remove all source of excitement from both system and part. The former part of this indication is met by a continuance of the antiphlogistic remedies; in regard to the latter, foreign matter is to be taken away, muscles relaxed, and the part so placed as not to be ruffled or irritated from without. 3rd. To encourage the matter's approach to the surface. For this nothing is so effectual as the constant application of hot poultices, which relax the skin, promote perspiration, soothe pain, and encourage the formation of pus. They should be large — so as not too soon to become cold or dry: they should be soft, that they may not irritate: light, that they may not

particular — and they should be renewed very frequently. They made be made of bread and water, or milk, oatmeal boiled till it is soft, linseed meal, chamomile flowers, or of bran sewed up in a linen or muslin bag, which may be dipped into boiling water as often as it becomes cold.

The warm water dressing — that is a piece of soft lint or folded linen, dipped in warm water, and covered with oiled silk to prevent evaporation — is a good substitute for poultices in many cases, especially for irritable sores: but when there is much pain they are not so soothing as the large warm mass of a well made poultice. 4th To evacuate the matter by an early and free opening. As a general rule concerning the opening of abscesses, it may be remarked, that if they point and become pyramidal, without enlarging in circumference they may be left to burst of themselves: but, that if they enlarge in breadth and circumference without tending to the surface, they should be opened. In the following cases, however, the surgeon's aid is imperatively demanded.

I When matter forms beneath fascise, and other dense ligamentous textures, not in the sheaths of tendons, or under the thick cuticle of the

fingers and palm of the hand. Because, as there are opened or absorbed with the utmost difficulty, the pus, instead of coming to the surface, will burrow among muscles and tendons, extending the abscess to a great distance; producing extreme pain, and constitutional disturbance, by its tension of the fascia which cover it, and pressure on the parts beneath; endangering extensive sloughing, and the future motion of the part. Hence, as a general rule, all abscesses beneath fascia, or among tendons, or under thick cuticle, should be freely opened, as soon as the existence of matter is suspected.

II When abscess is caused by the extravasation of urine, or other irritant fluids, or when it contains an unhealthy matter, which might diffuse itself, and spread the disease; as in carbuncle.

III When an abscess is formed in loose cellular tissue (as around the anus) which would readily admit of great distension and enlargement of the sac, and more especially if the cellular tissue is partially covered with muscles (as in the axilla) under which the matter might burrow.

IV In suppuration near a joint; or in the parietes of the chest or abdomen; or under the deep fascia

of the neck: lest the abscess burst into the serous cavities, or the trachea; or cause compression of the trachea, oesophagus, or jugular veins.

V In suppuration of very sensitive organs, as the eye or testis.

VI When it is desirable to avoid the scar which will always ensue when the abscess opens spontaneously.

5th To subdue the fresh vascular excitement necessarily produced by the infliction of the artificial opening. Fomentations, poultices, and rest are still adequate to this.

6th To promote the contraction, filling up, and ultimate closure of the cavity of the abscess.

The three first indications are not long to be persevered in, ere the fourth is arrived at. Three or four days at the utmost — sometimes only as many hours — will suffice for fomentation and poultices: and then, according to the principles of sound surgery, evacuation should be performed. It is no doubt true that Nature herself is equal to the task, unaided, but its accomplishment should seldom be demanded of her, in acute abscess; for harm may accrue. 1st Time is unnecessarily wasted. Nature's mode of evacuation is a gradual and tardy process; the plunge of a knife is the work of an instant

and it may happen, not unfrequently, that time is all important to the patient. 2d. An unnecessary amount of pain is endured. Tho' after suppuration, the painful feelings attendant on the inflammatory process usually subside, yet they do not disappear; not unfrequently pain continues tolerably severe, and is not assuaged, until by the evacuation of the matter, pressure, tension, and ulcerative action have been effectually removed. The pain of opening is not slight, but it soon passes away: it is but as a very moderate cost of a most valuable purchase. If the suppurated texture be fibrous or osseous, or otherwise unyielding, pain is uniformly aggravated instead of being abated by the formation of pus. 3rd. Texture is greatly endangered. In the ordinary progress of an acute abscess, favorably situated, the majority of the surrounding parts are pushed aside, condensed and infiltrated by fibrin and serum, while at one point actual destruction of texture takes place by ulceration. But if the natural effort outwards be balked by resisting texture, as it is almost certain to be in deep seated abscess then pressure is increased to a deleterious degree at other and various points; and those parts which otherwise might have been merely

displaced and temporarily altered in their
tissue, now become the prey of an action which
is destructive. Cellular tissue is broken up,
muscles are seperated, periosteum is detached,
bone ulcerates or dies, cavities and canals are
opened into, bloodvessels may be perforated,
joints may be stiffened or destroyed. 4th. The
danger is not only local but general. Such des
tructive results cannot occur, without involving
the system in serious disorder. This would be
the case, even supposing the parts to dealt
with to be of themselves unimportant: but
they may be such as to perill existence almost
immediately: hemorrhage may occur from
a large artery or vein by ulceration; there
may be violent Inflm. of an internal serous
cavity, or clogging of the air passages, by purul
ent irruption. It is true, that important parts
have not only an inherent power of resisting
ulceration and other dangers from without, but
besides are strengthened by an especial outward
defence, as already shown; these will avail
to protect, until the abscess have been fairly
formed and indicated, giving notice to the
surgeon of its formation, and of the time for sce
ncision having arrived: but if this intimation
be neglected, and this opportunity be overlooked.

both the intrinsic and adventitious defence will be overcome, and danger and disaster ensue.

In former times, maturation or ripening of an abscess was talked of as an event always to be waited for, and made to precede artificial evacuation. It was held almost as magic in surgery that ere the knife could with propriety enter the cavity of the abscess, this should have attained a certain size, not inconsiderable, and have become quite superficial. Such delay may be suitable enough in the case of suppurated cellular tissue, almost or actually subcutaneous; yet time, and pain might both be saved even here. And from what has just been said, it is very obvious that in all cases where the abscess is either deeply seated or in the immediate vicinity of important parts, to practise delay is just to incur neglect and invite disaster. The general rule, therefore, undoubtedly is, to make an early and free opening in acute abscess: time and tissue are saved, and pain and peril avoided. And another general rules arising out of the preceding, is, — that in a truly acute abscess, cure by absorption is not to be calculated on in the treatment.

Under certain circumstances, however, we

purposely delay evacuation: that is, when our object is to obtain destruction of a part. In obstinate glandular enlargements, for example, which has resisted discussion, we usually endeavour to obtain suppuration — in its own texture if possible, but at all events in its immediate vicinity. Were we to open such an abscess, the glandular tumour might after ale escaped, and remain as obstinate as before; but, in order to ensure its breaking up and disintegration, we delay the opening, that the pressure of the pent up matter may act destructively.

The opening may be effected by the Knife, or by the Potassa fusa. In the great majority of cases the former is preferred as less painful, more expeditious, entailing no loss of substance, and less likely to excite and maintain inflammatory action which might extend and aggravate the original mischief. The preferable form of cutting instrument is the bistoury, sharp pointed, with a fine edge and either straight or curved.

The aperture should invariably be made dependent: that is, at the lower part of the cyst, in order that it may afford a free and sufficient drain for the purulent fluid

and thereby not only prevent re-accumulation but also favor contraction of the original cavity. And in determining the point which is most eligible with this view, we must of course, take into consideration the posture which the patient is to occupy during the cure: what is dependent in the erect posture, may not be so in the recumbent.

Sometimes abscess forms in the vicinity of large and important bloodvessels; as in the neck. And it may be alleged, in excuse for delay, that early incision cannot be made in such circumstances, without much risk to the vessels. It is not so. The abscess is a safe protection from the point of the bistoury, being interposed between this and the vessels. They may be injured, it is true, by a reckless plunge of the knife, or an unnecessarily extensive thrust but such things are not contemplated in the hands of a duly qualified practitioner. Any considerable quantity of matter having formed in immediate contact with the common sheath of the large bloodvessels of the neck, an incision may be made fearlessly down on the ordinary and normal site of these parts, without dread of hazard.

When the incision has been made

thro' a considerable thickness of parts, there is a chance of the line of the wound uniting prematurely: ere the cavity of the abscess has been closed, or its interior has ceased from purulent secretion: re-establishment of the abscess necessarily results. To avoid this, such premature union is to be prevented by the lodgment of a foreign body in the track, as for example, a thin slip of lint inserted gently with a probe, and retained. All stuffing and cramming of the wound is not only unnecessary, but injurious, painful at the time, and certain to excite subsequently a grave amount of hfl. probably followed by new and more extensive suppuration.

Equally wrong is squeezing of the part after incision. If the opening be free and dependent — as it should be — the matter will find its way out readily enough.

In certain cases the caustic is preferred to the knife. In small chronic abscess, in which opening has been delayed, the integuments are attenuated to a considerable extent at the most superficial point. On discharge of the matter, they have not power to effect cohesion with the subjacent parts, and perish sooner or later, either by ulceration or by sloughing. The use of caustic under such

circumstances not only opens the abscess, but, by at once destroying the feeble and thinned integument, expedites the healing process and renders the cicatrix both more sure and stable. Or, in addition to such a state of matters, obstinate glandular enlargement may exist, the abscess having formed in the cellular tissue around it. Were evacuation to be performed by incision, this gland would continue to project centrally from the wound, and thereby delay, or altogether perhaps prevent cicatrization; besides, it is an object to get rid of such morbid structure, even supposing it were not an obstacle to healing. Let the caustic which effects the integumental opening, be thrust into the gland in one or more places, and the result is a disintegration of the whole, by suppuration. Also, if the patient decidedly objects to the knife's use, from timidity or prejudice, and unwisely shun one pain to incur a greater, the caustic may be employed. The best form is the potassa fusa, pressed firmly on the part, until the abscess is entered — moved laterally also if need be to destroy integument — or pushed deeply to break up gland enlargement. A little oil is then applied, to neutralize the redundant alkali, and to save the surrounding parts, and the whole covered with a poultice.

Cold Abscess. Pus cannot be produced without Inft. but the latter may exist in so slight a degree, as to be scarcely, or even not at all, observable, and, on account of the too slight vital activity of the organ, and low state of the nervous power, and of the plasticity of the blood and the diseased diathesis, a thin serous pus is produced without the appearances of Inft. being manifest. The circumscription also of the pus in a definite cavity, proves likewise that Inft. must have been present. Abscesses thus originating are called chronic, cold, or lymph abscesses. They are always the consequence of a general cacochemic or dyscrasic affection, and arise either spontaneously and commonly in many places at once, or are produced by external injury, and their existence may be often unsuspected for a long time. They are mostly lined with a thin, reddish grey, distinctly organised cyst — and there is little or no vascularity in the parts adjoining, and the pus usually is serous or curdy. But sometimes the cyst is thick and cellulo-fibrous and the matter concrete, so as hardly to differ from an encysted tumour. Chronic abscesses are often deep seated whilst the acute are mostly superficial.

The commencement of cold abscess usually sets in without any perceptible local appearance,

with diminution of appetite, general uneasiness, slight fatigue, disturbed sleep, and so on. Next there appears on some part of the surface of the body (where many patients fancy they have had a sort of prickly sensation) most commonly between the shoulders, on the chest, on the loins, or the upper part of the thighs, a small, not discolored, elastic, scarcely fluctuating swelling, which is not painful, and at the utmost gives the patient an obscure sensation of tension and weight. Gradually the swelling enlarges, often to a considerable size, the fluctuation is distinct, and the symptoms of a disturbed assimilation become more marked. After a shorter or longer time the swelling begins to be painful, the skin covering it reddens, becomes tense, the general appearances mentioned are more decided, febrile action sets in, and the whole countenance of the patient is cachectic. The skin, continuing to thin, at last breaks, and a quantity of thin, pus-like, often completely putrid and stinking fluid is evacuated, followed by a clear discharge, which, if the neighbouring bone be destroyed, is of an ichorous character. By this great loss of the juices, and by the colliquative sweats and purging, which soon

set in, the powers of the patient are soon broken up.

In slight cases the stimulus of the air causes the interior of the sac to pour out granulations: the reddened skin around the orifice ulcerates — and the sore so formed may heal. If the restorative powers are weak, or the parietes of the sac have been unequally pressed together, or the abscess is caused by a piece of ~~bone~~ diseased bone, or some other permanent source of irritation, which is not removed, one or more sinuses may remain. If, on the other hand, the abscess is very large, or if, after the admission of air, the pus have not a free exit, a most serious train of consequences will ensue. The pus exposed to the atmosphere putrifies — the hydrosulphate of ammonia (the product of putrefaction) is absorbed into the blood — the interior of the sac inflames, partly from the irritation of the air, but chiefly from that of the putrid pus: and then the grave and irreparable local disease, together with the contamination of the blood, induce typhoid fever, under which the patient sinks.

Hence the danger of these abscesses with

be great, if the sac has attained a large size, and has advanced so far toward ulceration that a spontaneous and permanent aperture is inevitable — more especially if it be connected with diseased hip or vertebræ, which keep up the secretion of pus and prevent it from closing.

Treatment. When the abscess is small, stationary or nearly so; or of itself showing signs of recession by absorption, and more especially if so situated as to render the avoidance of deformity by cicatrix desirable — discussion is by all means to be attempted. The general system is to be put in good order, particularly as regards the secretions; the patient is to be denied most liquid of any kind, and enjoined to live sparingly on dry food. The Iodide of Potassium is to be administered internally beginning with small doses, and a direct stimulus to absorption is to be applied to the part. Of these the best is the Emp. Ammoniac cum Hydrargyro, or a succession of blisters when one is nearly healed. But, on the whole, the preparations of Iodine, are preferable, either in the form of ointment or of simple solution. My own experience, in which I am borne out by Mr. Miller would recommend the latter form, or rather the Tincture applied with a camel's hair brush. Even here great caution is requisite, and

should signs of overexcitement appear, it must of course be at once deserted from, and not resumed until the chronic state has been again established. A sea voyage, more especially when somewhat perhaeted and rough, has been often found effectual in discussing small chronic abscesses, as in the neck or groin. Probably in consequence of the profuse and continued exhalation from the general mucous surface, along with abstinence from almost all ingesta which such uncomfortable circumstances usually produce, favoring absorption in a high degree, and perhaps also owing to the action of the Iodine and other salts contained in the water of the Ocean.

When a small chronic abscess is not stationary but steadily advancing, and more especially when it is situated in an important neighbourhood, it should receive the same treatment as if it were acute; that is, free, early and dependent incision, leaving the part to granulate and cicatrize.

In some cases when a considerable portion of skin has become thin and red—evincing that it will certainly ulcerate, and form a large open sore, it will be advisable to apply the potassa fusa, so as to destroy it, and avoid the more painful and tedious process of ulceration.

If an abscess is seated in the neck of a female, it is of the greatest consequence to make an early opening, so that no scars may be left. The instrument recommended by Sir A. Cooper for this purpose, is a fine lancet, only 1/8 of an inch broad. The puncture should be large enough to extract all flakes, but no larger, and made transversely, so that the cicatrix may be hidden by the folds of the neck.

If the abscess is so large that the exposure of its cavity might lead to dangerous consequences; or if it is connected with disease of the spine or other bone (as in the case of psoas abscess) the following plan should be resorted to with a view of inducing contraction of the sac, and of diminishing the danger from a subsequent opening should one be established. A small puncture should be made at the most depending part of the tumour. It should be made valvular by drawing the skin a little to one side, before introducing the bistoury. As much matter as flows spontaneously should be permitted to escape, and then the puncture should be carefully closed by lint and plaster, and the patient kept at rest till it is healed. During the flow of the matter the greatest care ought to be taken to prevent the admission of air into

the sac. At the expiration of ten days, or a fortnight, when it is nearly refilled, a second puncture should be made (but not too near the former) and should be healed again in like manner. This operation should be repeated at proper intervals, taking care never to let the abscess become so distended as it was before the previous puncture, and using moderate support by bandages during the interval. Thus, in fortunate cases, these repeated partial evacuations, combined with proper constitutional measures will cause the abscess gradually to contract — so that it either becomes completely obliterated, or degenerates into an insignificant fistula.

This mode of treatment was introduced by the late Mr. Abernethy. He, however, recommended as much as possible of the matter to be evacuated at each operation, instead of allowing it to run spontaneously: which latter method is much better calculated to preclude the admission of air, and avoids all irritation of the cyst by rough handling or squeezing.

Should the valvular mode fail; that is, should Infl. supervene, in consequence of accidental transmission of air, or from any other cause, an instant transition must be made to the other mode of procedure. A free and direct incision must

be made into the abscess, so as at once to evacuate all the contents: the subsequent action will probably be severe, and perilous to the system; yet it is to be unhesitatingly encountered, as the less of two evils. For were closure of the original wound maintained under such circumstances, the constitution would be certain to suffer to a much greater extent, even supposing the local action to be less severe. There is great deterioration of the discharge a bad kind of purulent fluid is effused from the inflamed surface: the general contents undergo chemical as well as vital change, in consequence of the presence of atmospheric air: and if such fluid be kept pent-up within the cavity, absorption of noxious matter both in the gaseous and in the fluid form, is inevitable, inducing a grave amount of irritative fever, probably tending towards a typhoid result.

Sometimes — indeed not unfrequently — the cavity of the abscess contracts only to a certain extent: and then becomes stationary, or begins to extend in an opposite direction. This may happen in the acute form, but is much more likely to occur in the chronic. The opening which was originally dependent, and sufficient for effectually draining the whole space, may become insufficient; a new aperture — or <u>counter</u>

opening — consequently becomes necessary; It may happen that when the abscess has been large, undulating in its outline originally, or prone to subsequent extensions, two or more such counter openings may be necessary.

Ulceration.

Until lately, the Hunterian theory was generally received, that ulceration, or the process whereby a breach of continuity is effected in a living solid, by the action of the part itself, was the exclusive work of the absorbents. Without denying that absorption, by both lymphatics and veins, goes on to some extent during ulceration, and that a part of the destructive process may be so produced; yet, there is every reason to believe that the major and most important part is effected independently of that class of vessels; and that ulceration is a product of true Inflam: consisting of, first, a vital softening of the changed and suppurated texture, which then undergoes molecular disintegration, and is reduced more or less to an apparently fluid form passes away along with the purulent discharge.

Ulceration, like mortification, may occur in two different ways.

First, it may be preceded by inflammation

of the ulcerating part: Secondly, by congestion that is, by a stagnation of venous blood in the capillaries, this cause, however, is denied by Dr. Miller, who says, that congestion is the predisposing not the immediate cause, favoring the occurrence of Inft. which in his opinion is the only cause of ulceration, but from which, with all due deference, and distrust in our own judgment we must be allowed to differ.

I Inflammatory Ulceration. The formation of an ulcer thro' inflam. is precisely similar to the formation of an abscess: the only difference being that the former commences on the surface, the latter in the substance of a part. Suppose the skin to ulcerate from the application of mineral poison, for instance. In the first place, its surface inflames, and exudes serum or unhealthy pus, which elevates the cuticle into a pimple or pustule. When the pustule is opened, there appears a little hollow, filled with a whitish or greyish tenacious matter, consisting of the substance of the skin itself, which has lost its vitality and is about to separate, and of lymph or of unhealthy flaky pus with which it is infiltrated. If this is wiped off, the surface underneath is seen to be red, and it easily bleeds. Supposing the case to proceed, there is formed

a chasm, eaten into irregular hollows, with intervening red eminences, which easily bleed if touched: its edges are ragged, loose, and undermined the surrounding skin, red, hot, and swollen: there is a thin serous or bloody discharge, and a constant severe gnawing pain. An ulcer having these characters may always be considered as extending itself.

An excoriation is often the first stage of this kind of ulcer: that is to say, a portion of skin inflames, loses its cuticle, and discharges matter, and the excoriated portion may either heal, or, as we have just observed, may ulcerate.

Ulcers spread with varying degrees of rapidity: An attack of violent infl. may cause the death of a considerable portion in a very short time: this is said to be a sloughing ulcer. When an ulcer spreads very rapidly, but regularly and without sloughing of any great portion at one time, it is called phagedenic. And when it spreads more rapidly still, not by one fit of sloughing, but by the constant reiterated mortification of considerable layers, it receives the name of sloughing phagedena.

II Congestive Ulceration. This may be very briefly described as it occurs on the legs of old dropsical people. A small portion of skin, has its capillaries distended with venous blood, whose return is nearly

or quite suspended. Some of the serum (with which the cellular tissue is already distended) exudes under the cuticle, raising it into a blister. When this is removed there is seen a darkish layer of sloughing skin. This, like the last, may spread with every degree of rapidity: but whether a large tract of skin mortifies at once, or whether the smallest portion ulcerates, the process is one and the same.

III Combination of the two forms. But it most generally happens that ulceration consists in a combination of inf. and congestion: that is, in the inf. of a part already congested, or incapable, thro' weakness, of supporting inf. without loss of life. It may be observed also, that ulcers which have commenced thro' congestion may be extended by inflammation.

Certain Tissues are more prone to ulceration than others; those most disposed thereto, are the skin, with the mucous and synovial membranes. From these it may spread to other subjacent tissues, which yield to it with varying degrees of rapidity. The cellular tissue ulcerates very easily; but muscles, bloodvessels and nerves, very slowly; so that they often appear to be as it were dissected out in spreading sores, by the destruction of the cellular tissue around them. Tendons and ligaments are also very slow to ulcerate; but cartilage, bone and the

cornea, are in certain constitutions extremely liable to it. Often advantage is derived from this; sometimes not. The comparative immunity of the nervous and vascular tissues is blandly beneficial: and, in little manner, it is often fortunate that important parts are protected by fibrous expansion, which can necessarily resist, at least for a time, the encroachment of suppuration, advancing from without. But when the purulent collection is within the fibrous layer, then mischief is likely to accrue: inasmuch as the natural tendency of the pus outwards — by ulceration of intervening texture — is opposed, while deep and important parts suffer sadly by the delay.

The causes of Ulceration are the same as those of Pus: and the constitutions most liable to suffer, are those which are debilitated by intemperance or privations — tainted with syphilis or scrofula — or broken down by the excessive use of mercury.

The Parts most disposed to it, are those whose circulation is most weak and languid: as the lower extremities: and more especially if the return of their venous blood be in any way impeded by a varicose state of the veins. On this account fat persons are much more frequently affected with ulcers of of the legs than

the Short. Sir. E. Home states, on the authority of Dr. Young, that 22 out of 145 tall men, and only 23 of 276 short men, were discharged from a regiment in the West Indies, in four years, on account of ulcers, and this is one of the chief reasons for rejecting men with varicose veins in the legs by army recruiting surgeons.

Parts newly formed are, as has been before said, more liable to ulcerate than those of original formation. And this is equally true, whether they have been produced, 1st in consequence of injury, as cicatrices and callus; or 2nd whether they are developed from hypertrophy of a standard texture: as cutaneous tumours, which often remain stationary for years, and then, from some slight irritation, will give rise to the most destructive and spreading ulceration; or 3rd whether they consist in the deposit of a texture alien to the normal organization. Thus cancerous diseases consist in the deposit of a new texture, which, from its low powers of vitality, yields after a time, to disorganization.

In constitutions or parts predisposed to it, the slightest irritation may be sufficient to excite ulceration. In the healthy it may be produced by the continuous application of some irritant, so as gradually to exhaust the vital powers of the

part — such as continued pressure; the presence of irritating fluids: or depraved secretions. But it is not easy to excite genuine spreading ulceration in the healthy, unless by some specific cause, as the venereal, or some similar poison.

Inflammation subsiding, so does ulceration; and the action of destruction is followed by that of reparation — granulation. The succession may be rapid or slow. On the occurrence of gangrene, the dead part is separated from the living by ulceration; and in the furrow so formed, the two actions of destruction and reparation are usually seen at work together and in harmony. The ulceration has not proceeded much deeper than the true skin, when already in the true skin granulations are being formed, as if with the view of at once closing the breach and atoning for the loss of substance. Whereas we find many a breach of surface in the lower limbs, in which ulceration has for weeks ceased, but in which there may be no reparative effort for many weeks to come.

Ulceration may be attended with constitutional symptoms. If acute, full, persisting, there may be febrile disturbance of the inflammatory type. If chronic and tedious, with a profuse discharge, hectic may ensue.

Ulcers.

It is neither easy, nor absolutely necessary to give a rigorous definition of the term ulcer. For all useful purposes, it will suffice to say that it signifies a chasm on the surface of any organ caused by the destruction of a portion of its substance by disease; or by an injury which has not been repaired.

The following rather more elaborate definition is by Chelius "An ulcer" says he "is a long existing division of organic parts depending on irregularity of the vegetative processes, and accompanied with the secretion of an ichorous and sanious fluid, and a continuing destruction of the parts in which it is situated. Ulcers are therefore distinguished from abscesses and suppurating wounds, but may originate from them, if by a change of vitality in the suppurating surfaces the process of regeneration be converted into ulceration, or ulcerative absorption."

The causes of ulcers are either internal or external. The former consists in a peculiar deviation of the whole organism, or of single organs, from the natural type, with a great degree of weakness and flabbiness, or with those diseases, of which the ground depends on some change in the assimilation, for instance, acute and chronic eruptions of the skin, scrofula, syphilis, gout,

scurvy, dropsy, suppression of the usual discharges, and the like. These diseases, either of themselves or after the operation of an occasional cause, produce an ulcer. The external causes are all injuries which, producing infl. and suppuration, break up the connexion of parts; wounds, abscesses, the healing of which is prevented by an existing disease, or by improper treatment; specific diseased matter operating locally, and the like.

The Prognosis in ulcers varies. 1st According to the nature of the cause which produces or sustains it. 2d According to the position of the ulcer. Here the importance of the affected part and of the neighbouring tissues must be considered. Ulcers in the skin and in fleshy parts heal more readily than those in tendinous parts or glandular organs. Ulcers in bones are always very intractable. In parts distant from the heart the cure is always difficult. 3rd According to the direction and extensive form of the ulcer. The older an ulcer is, the more tedious is its cure, and if this be forced, dangerous symptoms may be produced by the suppression of its usual secretion. The more foul an ulcer is, the more spongy its bottom, the more excited and hardened its edge, the more ill conditioned the fluid secreted in it, the deeper it penetrates and the larger

the destruction of the soft parts which it produces, the more difficult is the cure. Round ulcers are generally more tedious in their cure than oval ones. 4th According to the constitution and age of the patient. In young subjects, if the constitution be little affected by the reaction of the ulcers, the healing is quicker than in old and already much debilitated persons.

The Student and even the young practitioner are too apt to regard lightly, and treat as dry and uninteresting these every day occurrences in the practice of surgery; but a little reflection will show them that they err greatly in such an estimate, of which in truth constitute one of the most important classes of disease which come under the surgeons notice. The very frequency of their occurrence renders it eminently necessary that our art should be well prepared with an efficient remedy: the more especially when it is remembered, that these accidents are most likely to befall those whose limbs are of most value. The rich man, even when otherwise comparatively unhealthy, is rarely affected with ulcers of the limbs. The poor and labouring man is too often ill-clothed, hard-worked, sometimes ill-fed; all day in the erect posture, often wet and weary, and liable to external injury in the exercise of

of his calling: and it is in such members of the community that by far the greater number of ulcers are formed, and usually of a formidable kind. Should the disease threaten in the leg, he lays himself up forthwith, the suitable remedies are employed — of which perhaps rest and position are the most important — and in a few days probably the part is cicatrized. But the poor man cannot afford to do so; his limb is ulcerated; as yet however, it is not very painful, and he works on: it gets worse, but the erect posture is still practicable and it is maintained: and often it is only after the sore has both inflamed and sloughed, that the stout hearted laborer abandons his work, and applies to the hospital or to the surgeon for relief. In proportion to the reluctance of his application, is his anxiety for restoration; his family depends on his exertions for food: and if the period of cure prove too protracted, pinching poverty with too surely be their lot. Thus a heavy responsibility may be almost daily thrown on the practising surgeon: which he must be fully prepared to meet, else his life cannot be one of either happiness or contentment. But as the right understanding of a disease, is at least in one sense, half its cure, we will proceed to consider this subject more minutely.

There is no more serious error than that of exclusively treating disease by name, and in the abstract: instead of inquiring carefully into the nature of each individual example, and bringing forward remedies appropriate to each sign or symptom, as they may occur. And there is every reason to believe, that such careless generalization in practice is found to affect the treatment of no disease more frequently than that of ulcers. One lotion, one ointment, or one plaster or poultice, comes to be regarded as quite a panacea, and is used in all cases indiscriminately — whether for benefit or hurt, being a mere matter of chance with probability bearing much toward the latter. To avoid such injurious haphazard in treatment, it is essential that we understand thoroughly the nature of all the varieties of sore: and toward this end there is nothing so useful as a right classification: each variety showing its distinguishing characters, and bearing at the same time its appropriate treatment. Not that we mean to designate each as a separate disease, but only as a separate variety of the same disease — ulcer; entreating you to remember that in the treatment of such affections much care and watchfulness are required: inasmuch as they have a great tendency to pass from one form into another

and that by no very gradual and protracted transition: and that consequently an application which is altogether suitable one day, may on the next become very inappropriate.

Classification. Ulcers present many varieties, which may be classed under three heads. 1st They may be in a state tending to reparation: as the healthy ulcer: 2dly Their surface may have an imperfect form of organization, under which they may be incapable of healing, tho' they are not necessarily spreading: the weak and indolent ulcers are examples. 3d They may be under the influence of the destructive process which formed them originally, and which is still causing them to spread: as the phagedænic. For the sake of greater convenience they are still further subdivided into. 1. The simple purulent, or healthy sore. 2. The weak. 3. The Scrofulous. 4. The Putrescent. 5. the Irritable. 6. the Inflamed. 7. The Sloughing. 8th The Phagedænic. 9. The Sloughing Phagedæna.

I <u>The healthy ulcer</u> is nothing more than a healthy granulating and cicatrizing surface. The granulations are small, numerous, florid and pointed, and yield a moderate secretion of healthy pus. The edges are smooth, and covered with a white, semi transparent pellicle, which is gradually lost on the margins of the granulations. It will be seen

lected that a healthy sore of this description will be greatly diminished by the contraction of the surrounding skin, before any cicatrization has actually commenced.

Treatment. The only treatment required will be a little dry lint, if there be much discharge — or the water dressing or simple ointment, if there be not. If there be not much discharge, the dressings should not be changed more frequently than every second or third day. If the granulations are too luxuriant, they may be touched with lunar caustic, or sulphate of copper, and dressed with dry lint — or the sore may be exposed to the air for some hours. If the granulating surface is very extensive, or if all applications disagree with it, as sometimes happens, it will be expedient to form a scab on its surface. This may be done by allowing the pus to dry, or by sprinkling a little flour, calamine (prepar. carb. of Lime) or chalk to absorb it. But the best plan in these cases is to pass a stick of lunar caustic over the surface of the sore, as recommended by Mr. Higginbottom. This salt instantly coagulates the fluids on the sore, and forms a white pellicle, which soon becomes dry and black, and is much less irritating than an ordinary scab. If the scab act favorably, suppuration ceases, and cicatrization will be found

complete when it is detached. No other dressing is required except a piece of gold beater's skin, and a slight bandage, to prevent injury. If pus continue to be formed, a small hole should be made in the middle of the scab to let it out.

II The Weak Ulcer. is usually the result of the preceding, when from any cause, local or constitutional, cicatrization has been delayed, and debility has usurped the place of sufficiency of action. Its powers of organization are deficient. The granulations are large, pale, flabby and insensible, rising above the margin of the skin, and showing no disposition to cicatrize. The discharge is pale and thin, the serum greatly predominating over the solid particles: there is but little fibrin, whether going to waste as pus, or going to repair, as granulations.

Causes. This state of ulcer may be owing to debility of the system: but the healthiest granulations, if their healing be delayed, become weak — and conversely, if any granulations do not cicatrize, they should be considered weak, and treated accordingly.

Treatment. Prevention being better than cure, it will be our object to prevent decline from the healthy condition, if circumstances place this within our power. The indications are to avoid

ment the vital forces of the granulations, and to restrain their exuberant growth. The granulations getting pale, flat, changed both in form and number, we abandon the simple waterdressing and have recourse to stimulants: gentle at first, lest over action be induced: in avoiding one obstacle we take care not to encounter another still more opposed to the healing process. The piece of lint instead of being steeped in plain tepid water, is saturated with a solution of a stimulating nature, such as sulphate of Zinc, or copper, nitrate of silver, chloride of soda, creosote, etc. If the granulations are extremely exuberant they may be destroyed by escharotics, such as the sulph. of copper — or sometimes they may be shaved off with a thin knife:- but it is better to cause their removal by over stimulation than by actual destruction. One of the best applications is fine dry lint, which by itself is an excellent stimulant. The formation of a crust or scab, according to Mr. Higginbottom's plan, with lunar caust. may be often resorted to with advantage. At the same time pressure by means of strips of adhesive plaster, or compresses and bandages, are necessary to prevent languor of the circulation, especially if the muscles are wasted and flabby. In some cases a scab may be formed, by covering the low

with powdered rhubarb, taking care to cut the edges, so that they may not be irritated by it. If the patient is young and weakly, with great coldness and blueness, and tendency to oedema in the extremities, the limb may be immersed in tepid salt water for fifteen minutes twice a day: to which an equal portion of decoction of poppies may be added if pimples are produced.

But local treatment alone is not sufficient. The general system requires our aid, as well. Secretion and excretion, having been found in order, or duly restored, nutritious regimen is enjoined: animal food, wine, malt liquors: given with a freedom proportioned to the powers of digestion: and all sources of depressing influence are studiously avoided.

III The Scrofulous Ulcer. This class of ulcer is weak almost from the first: for it is only one indication, among others, of a system not only decidedly weak, but of such debility as establishes a decidedly vicious or cachectic state — that of scrofula. Such sores seldom occur singly, but in clusters: they are gregarious: at first distinct from each other but ultimately becoming more or less confluent. The most frequent sites are, the neck, shoulders, arms, hips, lower limbs

especially in the neighbourhood of the articulations. The sores extend more in surface than in depth: yet their origin is not in the skin, as most other ulcers are, but in the sub-cutaneous cellular tissue. The commencement is made there by tubercular deposit, causing induration and enlargement, at first painless: then perverted vascular action sets in of a higher grade than the merely nutritive, and the consequences are, pain in the infiltrated part, increase of swelling, and redness of the superincumbent integument, with the other ordinary signs of the chronic inflm. process: imperfect suppuration takes place: the swelling softens and pits on pressure: by and bye fluctuation is felt, and the fluid is seen thro' the integument very much attenuated: but there is no regular pointing: almost the whole of the integument over the suppurated and infiltrated part becomes thin, blue, and traves lucent: it gives way partly by sloughing, partly by ulceration; and thro' the large, ragged, irregular aperture thus formed, the thin pus, with broken down tubercular matter, and portions of sloughing cellular tissue, is discharged. For some time no effort is made towards reparation; on the contrary the integument still farther ulcerates, and the infiltrated tissue

beneath it oozes away. The surface has no granulations, and is of dirty gray hue, surrounded by thin discolored skin, undermined, inverted, and floating loosely on the subjacent parts. After a time, some parts of the infiltrated tissue have been cleared away by disintegration or sloughing, and granulations begin to appear: but they are weak, pale, pale, and exuberant. The system, originally in a bad state is worse now, sympathizing much with the local disorder, and usually evincing more or less intensely the ordinary signs of constitutional irritation: at first, during the inflammatory and suppurating process there may have been an effort towards sympathy of a sthenic kind: irritative fever, however, is more likely to occur than the inflam. and the ultimate result is usually a hectic.

Such sores, if left to themselves, sometimes skin over, at least in part: imperfect cicatrices of the tuberculated texture having probably been effected by either ulceration or sloughing, or by both. But such cicatrices is very unstable, and certain to break open at no very distant period, disclosing a state of matters beneath, not in the slightest degree amended. It is blue, soft, spongy, and elevated:

whereas the true cicatrix is white, firm, and depressed.

Treatment. It need hardly be told to you that the more important part of this is constitutional: attacking not one symptom of the disease, the sore; but the disease itself, the scrofula. The general management of scrofula you will learn in full from the Professor of the Theory and Practice of Physic, more in extenso, than the limits of these lectures will allow.

The local management requires to be energetic and at first severe. Medicated lotions, ointments, poultices, will prove wholly unavailing in this class of sore. There is an unsound foundation for the reparative process, and that must be cleared away. The potassa fusa, in substance, is inserted boldly into the infiltrated cellular tissue; if the integuments have not already given way, they will readily yield before this; and then it is freely moved in various directions, so as to destroy thoroughly not only the cellular tissue when tuberculated, but also the integuments where thin, blue, undermined, and obviously incapable of recovery. Ulcer after ulcer is thus treated until not only is each cleared of the dead and dying textures, but the burrowing inter-communications are also freely exposed, and similarly

freed from their unsound parts. It is, in truth a painful, but an effectual process, and should be done determinedly — rapidly yet carefully; and it is better to overtake the whole at once, than to temporize with partial instalments. The surrounding parts during the operation are protected by oil, and afterwards oil is freely applied to the part, to allay pain, and prevent the undue extension of the process. Dark bloody discharge oozes out during the application, this is to be carefully wiped away. After such discharge has ceased, the whole part is covered with a poultice, and this dressing is continued until the slough has separated, disclosing a healthy granulating surface beneath — firm red, vascular, and sensitive: then the water dressing is resumed, and the local management afterwards conducted as for the first class of sore, into which the original affection, has been in fact converted. After cicatrization it is to maintenance of general treatment that we must look for prevention of relapse: along with uniform support afforded to the part, more especially when this is in the lower limb. Bandaging — or still better a laced stocking, with its upper part more loosely applied than the lower, in order to obviate congestion from venous obstruction — is

under such circumstances a most valuable means of prophylaxis. Also be it remembered, that all cicatrices, more especially when extensive, and the result of sores defective in action, require much care, being by reason of recent and imperfect organism very little to be undone by re-accession of ulceration.

IV The Indolent Ulcer. Perhaps this is the most common of all ulcers: it is most frequently found on the lower extremities, and at a somewhat advanced age. It is invariably of secondary formation; this condition of confirmed deficiency of both action and power having supervened on a state of matters widely different. The sore may have been at first healthy, then inflamed, perhaps thereafter irritable, then weak, and ultimately indolent: merely in consequence of cicatrization having been often opposed and long delayed, by the situation of the sore, and by the accidents to which it has been exposed. A weak system is often found co-existent, and may have had some share in the production of the local debility. It can hence be readily understood how such sores should be most frequently found in the legs of the labouring classes: so frequently indeed, as almost to warrant the assertion that the indolent sore is peculiar to that class of the community.

Its surface is smooth and glossy, and of a pale ashy color, like a mucous membrane. Sometimes, however, it displays a crop of weak, fungous granulations. The edges are thick, raised, white and insensible: the discharge scanty and thin. These ulcers are often stationary for a great length of time: but, from any slight cause of irritation, may enlarge rapidly by ulceration or sloughing: and even when they have made considerable progress in healing, the granulations and cicatrices that have been months in forming may perish in a few hours from some constitutional disturbance or local injury.

The Mucous Ulcer, of some authors, is merely a variety of the indolent class, in which the raw surface, by reason of long persistence, has been thoroughly converted into a resemblance of mucous tissue pale, red, smooth, and vellous; shining, as if varnished; with a limpid, quasi mucous discharge.

Treatment. The general rules are, to promote constitutional vigour by good diet and tonics, and to excite the local actions by various stimulants. The patient should take moderate exercise: but when he is at rest, the affected limb should not be permitted to hang down. In treating the cases, we must not only endeavour to effect a cure, but to make it permanent: and this can be insured

only by attending to the growth of the granulations, and rendering them as healthy and as firm as possible.

When an ulcer of this description, in an inflamed state comes under your notice, the patient is to be put to bed, and a poultice applied to the sore and its vicinity: The tongue will be found heavily coated, with other plain indications of great derangement in the primæ viæ: an active purge, repeated if necessary, is therefore highly expedient. Low diet is enjoined; and if this, with the action on the bowels be not quite equal to allay the inflammatory fever, which is likely to be more or less developed, antimony may also be exhibited. Thus in a few, to use an ordinary expression, the sore becomes cleanse; that is the slough, having become completed, separates by ulceration: the vascular action subsides from the suppurative and ulcerative grade, remaining in a more subdued, but yet exalted form, favourable to plastic effort; and, consequently, on detachment of the slough, a healthy surface is usually found beneath, demanding the mode of treatment suitable to the healthy ulcer.

When the sore is presented to you in the simply indolent state, two modes of treatment are offered for your selection. The first, is, in irritation

of Nature, to endeavour by stimulation to induce the inflammatory process; the second, is, to undo the surrounding elevation, and change the surface into a granulating sore.

A blister will sometimes fulfil the first indication admirably; the only objection to it, being a chance of inducing too high a grade of action and of inducing a worse disease, viz, erysipelas; or some pieces of lint, saturated with the nitric acid lotion, or zinc lotion, or with some other stimulating substance should be applied. Then strips of adhesive plaster about 1½ inches wide, should be applied ⅔ around the limb, from an inch below the ulcer to an inch above it: and, in applying each strip, the edges of the sore should be drawn together with a moderate degree of force. Next, a compress of soft linen must be laid over the plaster, and finally the limb must be well and evenly bandaged from the toes to the knee: observing that the bandage is to be applied most tightly below, and more loosely by degrees as it ascends.

The following plan recommended by Mr. Baynton, is often found very advantageous, and is therefore worthy of being introduced to your notice. He advises us "to encircle the whole circumference of the limb with strips of plaster, from an inch below to an inch above the ulcer. Each strip is

to be first applied by its middle to that part of the limb which is opposite the ulcer, and then the two ends are to be brought forward over it, and they should be long enough to overlap about two inches. A compress and bandage are to be applied afterwards. These modes of dressing almost always cause severe pain — but it ought soon to subside, and the part feel stronger and more comfortable afterwards. If, however, it continue to be painful and hot, some pure water should be poured on the bandage.

If the adhesive plaster irritate the skin, it may be diluted with soap plaster — or the isinglass plaster may be substituted. This is made by dissolving isinglass in spirits of wine, and spreading the solution on silk. It readily adheres if moistened with a warm sponge.

But altho' the plastering and bandaging are adapted for most cases, the immediate application to the ulcer will require to be frequently varied. Sometimes the strapping may be applied without any thing else; or dry lint may be placed under it; or lint imbued with lotions of Sulph. of copper, or of alum; or with lotions made by adding half an ounce of the tinct. of myrrh, or of the comp. tinct. of benzoin, or ether to four ounces of water; or of the balsams of Copaiba or Peru; but metallic preparations agree better in general than

the vegetable. Ointments agree better with the indolent than with the other varieties of ulcer, because they do no harm if rancid. The Ung. Hydrarg. Nitratis Oxydi, or red precipitate ointment is very useful: and the Ung. Hydrarg. Nitratis dilutum, or Citrine ointment, is said to possess great efficacy in reducing thick callous edges. Mr. Stafford of England, recommends old deep indolent ulcers to be treated by filling up their cavity with a mixture of one part of Venice Turpentine and four of beeswax, melted, and poured in warm.

If a crop of granulations threatens to sloughs, they should be fomented with hot decoction of poppies, to which a little spirit of wine has been added. The gastric juice of animals is said to be a specific for certain sloughing ulcers occurring in persons, debilitated by the use of ardent spirits and salt provisions, and a residence in hot climates. During any febrile disturbance of the system, the local applications must be mild.

It has also been proposed to treat indolent ulcers in debilitated constitutions, by the administration of small doses of opium night and morning, with the view of keeping up the capillary circulation.

The healing of old ulcers should never be attempted, when, for example, a sore has existed for many years, almost stationary, or only varying

with obvious changes in the system: tending to inflame and extend, during constitutional disorder, contracting again when this subsides, yet never approaching to complete cicatrization without ill health ensuing — and this again relieved by renewed establishment of the sore. When the gouty diathesis is strongly marked, and its alternations are plainly connected with the ulcer's varying state. When the patient is advanced in years, has been in hot climates, or has been what is usually called a free liver. Under these circumstances, we do not think of drying up the sore — which may be truly looked upon, somewhat as a safety valve to the system — but content ourselves with the application of some simple and soothing dressing; leaving what may be termed the ebbing and flowing of the ulcerative process entirely in the hands of Nature: our dressing tending only towards comfort and protection.

Some sores may be healed with safety, but only when an <u>issue</u> for some time supplies their place, as a drain in the general economy. A sore secreting constantly a considerable quantity of pus, may have existed for years in the limb of an elderly patient. No prudent surgeon would ever think of drying that up suddenly by cicatrization — even had he it in his power to do so,

without leaving some substitute in its room, as a seton or issue in some convenient part, at least for a time. For the sudden cessation of purulent discharge to which the system has long been habituated, would be certain to occasion a plethora: thus, in its turn inducing determinations of blood to certain parts; and thus serious danger to the important internal organs would accrue, by hemorrhage, sanguineous infiltration, or establishment of the inflammatory process. Apoplectic seizure is especially probable under such circumstances. Yet doubtless, the continuance of such a sore is not only a considerable inconvenience, but likewise has a debilitating effect on the general system, and consequently tends to the induction of diseases to whose accession constitutional debility is favorable: its closure ~~its~~ is therefore desirable. And should none of the unfavorable circumstances before stated exist, such closure may be safely enough conducted in the ordinary way: taking care, however, to establish an issue in some convenient and adjacent part, so soon as the discharge begins materially to lessen. This artificial drain is kept in pole open for some time — and then, by gradually diminishing the bulk of the foreign body by whose presence healing is prevented and discharge

maintained, the system is so gradually subjected to the diminution of the waste, that its ultimate cessation is scarcely appreciated.

Irritable Ulcer. This is a variety of the inflamed, as is described by Mr. Key, as having an excess of organising action, with a deficiency of organisable material: so that the granulations are too small, and are morbidly sensitive and vascular. It is usually of secondary occurrence; and the result of accident, of malaprasia, or of a depraved state of the system. It is almost invariably superficial, not penetrating deeper than the true skin; and this may partly account for the great sensibility of the sore. The surface is unequal, deeper at some points than others; it is void of granulation; and either of an angry, darkened fleshy hue, or covered with a greyish film of tenacious aplastic fibrin: sometimes this covering only partially invests the surface, which then shows both the red and grey appearances. The edges are thin, serrated, and excoriated; of a red angry hue, and sometimes studded with brightly florid points as if of arterial blood. The surrounding skin is slightly swollen, and also of a dull red color, being in a state of passive congestion; or perhaps, not yet recovered, from the chronic inflammatory process. The discharge is

thin, acrid, bloody often mingled with bad matter — either recently effused, or from disintegration of the old. Pain is constant, always considerable, often excessive: the slightest interference with the acutely sensible surface is followed by intense burning pain, and by a copious flow of blood, usually of a dark grumous character. Generally an irritable state of system precedes and accompanies this state of the part: but even when no such predisposition exists, that morbid condition of system is almost certain to occur, an example of constitutional induced by local irritation. And along with the ordinary symptoms of the constitutional form — more especially restlessness, want of sleep, loss of appetite, emaciation, general disorder of secretion — there is often a remarkable peevishness of temper combined.

This kind of sore is liable to occur any where; more especially if it follow on eruption as it very frequently does: but its most frequent location is on the lower limb, as on the shin, and near or over the ankle. It is not unlikely to pass into the next class of ulcer: an example of which is not infrequent — irritation inducing inflammation.

The treatment is partly, and sometimes mainly constitutional: the predisposing, if not the

exciting cause is in many cases to be found in the system, and must be opposed by the suitable remedies: with this view, we are never to overlook the condition of the primæ viæ, and of the general secretions. In other respects, the treatment suitable to constitutional irritation is maintained, along with the local management. The most successful plan, generally speaking, is the application of a succession of mild stimulants, so as to alter the action and enhance the irritability of the part. Weak lotions of nitric acid, of nitrate of silver (gr. to ℥j.), of arsenic, of sulphate of zinc, of corrosive sublimate, of chloride of soda, of acetate of lead, of iodine, black wash, yellow wash, solutions of sulphate of iron, forge water, that is, water in which red hot iron has been extinguished, strong green tea, powdered chalk or charcoal mixed with cream, ointments of Peruvian balsam, of chalk, oxide of zinc, lead, and calamine; weak mercurial ointments, liniment of Ung. Hydr. nitrat. moderate pressure with strips of soap plaster, or of linen spread with soap cerate, or with a smooth piece of sheet lead; will be occasionally found of service in the cure of obstinate and irritable ulcers. For it very often happens that an application which at first soothes the pain, with soon lose its good effects, and then become positively hurtful.

Inflamed Ulcer. This presents the ordinary characters of advancing ulceration, with accompanying inflam. action: and, is the most common original form of ulcer. Very often, however, it is of secondary accurrence, for over-stimulation is not unlikely to happen in the treatment of ulcer of a healthy, or even of a sluggish kind. The raw surface is gradually disintegrating: and instead of contracting, it gradually enlarges: showing no granulations, but a soft, raw, pulpy substance, and emitting a profuse ill-formed pus, mingled with the ulcerative debris. The margins are livid, red, hot, tense and painful; and so is the surrounding integument. The erect posture, and motion increase the pain: the system is more or less involved in febrile disturbance of the inflammatory type: and the primæ viæ are usually found in marked disorder. Not infrequently the action running high, while local power is weak, sloughing takes place, more or less extensively: as already noticed in regard to inflam. supervening on the indolent variety of Ulcer.

In a few instances, when the patient is very plethoric and strong, it may be expedient to bleed, and to administer calomel, antimony, and opium, till the mouth is slightly affected.

In all cases the bowels should be cleared, the secretions kept up, and the diet regulated. Let not, however, the antiphlogistics, even when indicated, be continued one moment longer than is absolutely necessary, otherwise degeneration into the weak kind is speedy and certain: let it be always remembered, that a part once truly inflamed, is ever after defective in vital power. The patient should keep at rest, with the affected member in an elevated posture. Leeches may be applied in the vicinity of the sore: but not too near it, and not to any place where the skin is much thickened and congested, lest the leech bites themselves take on ulceration. The part should be fomented night and morning for half an hour with poppy fomentations, and then a poultice or the water dressing may be applied — and if the pain be very severe, the poultice may be medicated with opium, conium, belladonna, hyoscyamus etc, cautiously applied. If the ulcer diminish under these applications, but yet its surface remains foul, they may be continued till it is healed: but if the surface become healthy it may be treated as an ordinary ulcer. If warm applications aggravate the pain, cold evaporating or saturnine lotions should be used, the sore being protected by a piece of

oiled silk or simple dressing.

If all these soothing measures prove ineffectual; as they occasionally will, even tho' aided by the most judicious constitutional treatment, recourse must be had to the treatment detailed when discussing of irritable ulcers.

The Sloughing Ulcer is formed whenever either of the other varieties of ulcer is attacked with sloughing — which is particularly liable to occur to the Indolent form, when subjected to undue irritation. Or this name may be given to ulcers originally produced by a sloughing of the skin — as in the legs of the dropsical.

The best applications are warm fomentations of decoction of poppy, to which a little spirit has been added; and stimulating poultices of yeast or carrots; or the nitric acid lotion on lint, with a warm poultice over it.

The Phagedænic Ulcer. This is a peculiar variety of ulceration extremely rapid in its progress. Two forms occur the acute and the chronic.

The acute is usually a sore of irregular form; with margins abrupt and somewhat ragged, and there as well as the integument to some distance around, the seat of active vascular

action, are red and slightly swollen. The sensation is of a sharp, burning heat. The raw surface is of a brownish hue, totally void of any thing like granulations, of uneven depth, and in many places presenting the appearance as if gnawed by the tooth of a wild animal. The system suffers severely; and the form of disorder is that of constitutional irritation.

The chronic variety is less painful, less inflamed, less rapid, darker in hue, with the gnawed appearance usually more distinct, commonly surrounded by considerable induration, and often spreading at one aspect, while slowly cicatrizing at the opposite; without the constitutional disturbance is less severe.

This disease may be induced by extraordinary local irritation, or by some peculiar constitutional disorder. It may attack primary or secondary venereal sores in consequence of filth, intemperance, the abuse of mercury; or of a weakened, and vitiated or scrofulous habit, or of some peculiarity in the venereal virus. Sometimes it appears in the throat after scarlatina. It may attack a blistered surface when the constitution has greatly suffered from an acute and exhausting disease

as measles etc. sometimes it affects the genitals and mouth of children, constituting cancrum oris, gangrenopsis, etc. —

Sloughing Phagedæna or Hospital Gangrene.

This gentleman, is a disease which most fortunately for us, is of excessive rarity in this country, and therefore the account I shall give you of it, is drawn necessarily chiefly from foreign authorities. It seems, says Mr. Lawrence, to be the state of phagedæna carried to its fullest extent; or rather a process intermediate between common ulceration and gangrene. Its causes are 1st great local irritation combined with a vitiated state of the constitution. 2d. Contagion, that is, the application of poisonous matter to a wound; and 3d. Infection that is the reception of poisonous miasmata into the blood. We shall first describe it as it occurs sporadically in private practice, when it is called sloughing phagedæna: and next of those more serious visitations that decimate the patients in crowded naval or military hospitals, whence it derives its other name, hospital gangrene. In civil hospitals any serious attack of hospital gangrene is almost unheard of. Yet, it occasionally threatens to appear. Of this you

you will find, some examples, in the Lectures of Mr. Liston, in the London Lancet for 1845.

In the cases seen in civil practice the disease is mostly seated in or near the genital organs: in the cleft of the nates, in the groin, or at the upper and inner part of the thigh. It often, but far from invariably supervenes on syphilitic ulcers; especially in prostitutes who have been exposed to cold and wet, and privation of solid food, and the abuse of ardent spirits. It is especially liable to be induced by the too free administration of mercury, or by intemperance and exposure to wet during a mercurial course. The worst cases, however, appear to arise from neglected local irritation without any specific virus; as from acrid discharges, and want of cleanliness. Mr. Lawrence mentions the case of a young woman who had suffered from severe female pox, and from diarrhoea after it. The continual moisture from the rectum, with a mucous discharge from the vagina, irritated and inflamed the skin of the nates, and caused a large sloughing phagedænic excoriation on both sides.

It usually commences as a highly irritable and painful boil, surrounded by a halo of dusky red inflammation, and much

elevated; the patient also in general having mucous discharges from the vagina, and a diffused redness of integuments in the vicinity of the pudenda. There are severe darting and stinging pains: which are at first intermittent but gradually establish themselves as a constant symptom, with occasional exacerbations. When the pustule is ruptured: the exposed surface of the ulcer displays a chaturm of adherent thin colored flocculi, mottled with darker points of reddish brown and gray. The sore then forms soon enlarges in breadth and depth: the edges become everted, and attended with a circumscribed thickening, which is surrounded by dusky infl. and diffused puffy swelling. The surface is composed of grey or ash colored sloughs, which may become brown, or may resemble coagula of blood. The discharge is reddish brown, and peculiarly fœtid, and there is occasionally severe hemorrhage. Meanwhile the agonizing pain, the hemorrhage, and the absorption of putrid matters, soon induce severe irritative fever — ushered in by loss of sleep, anxiety, restlessness and thirst, which, with an exhausting diarrhœa produce death in about three weeks; and, as delirium is rare, the patient retains a miserable consciousness of severe suffering

till the end. The disease is highly contagious, but it appears to be a local disease, and both the constitutional and local symptoms may be removed by measures which destroy the acrid secretions of the ulcer.

Hospital Gangrene is the name given to this affection when occurring in naval, and military practice.

It is engendered, like other putrid maladies, by crowding together a number of sick and wounded men; and by inattention to cleanliness and comfort, and to free ventilation, which is so necessary for carrying off the noxious miasmata always generated under these circumstances. It is frequently a concomitant of dysentery or typhus, originating in the same sources. It may affect any kind of wound, or even a mere bruise.

This disease, when once generated, may either spread by contagion; that is, by the contact of the morbid secretions; or by infection that is thro' the medium of its vapour or effluvium. It may, altho' rarely, occur sporadically; that is may be induced in isolated cases by improper and irritating local and constitutional treatment of the wounded.

According to Mr. Blackadder, in his observations on Phagedæna Gangrenosa (Edinb 1818), it begins in the form of a livid vesicle at the edge of a wound or sore, accompanied with an occasional painful sensation like the sting of a gnat. Sometimes it first appears as a small livid spot on the sore, near the circumference. In either case the disease soon spreads, and converts the whole surface of the ulcer into an ash colored or blackish slough. The discharge, if previously healthy, is at first diminished in quantity and sanious; but soon becomes profuse, and dirty yellowish or brown. According to this author, the hospital gangrene is at first a purely local affection, like the sloughing phagedæna; and he says that the constitutional symptoms, such as typhoid fever, etc. do not make their appearance before the third or fourth, sometimes not till the twentieth day.

The following account by Dr. Heaman, in his Principles of Military Surgery, varies somewhat from that of Mr. Blackadder. "Let us suppose, says the former, "that our wounded have been all going on well for several days, when suddenly one of our most promising patients complains of severe pain in his head and eyes,

a particular tightness about the forehead, loss of sleep and want of appetite: and that these feelings are accompanied with quickness of pulse, and other symptoms of fever: his wound, which had been healthy and granulating, at once becomes tumid, dry, and painful, losing its florid color, and assuming a dry and glossy coat. This is a description of the first stage of our Bilboa hospital gangrene, and if a brisk emetic were now exhibited, a surgeon, not aware of the disease that was about to form, would be astonished at the amelioration of the sore, and the unusual quantity of bile, and undigested matter evacuated by vomiting" If this incipient stage was overlooked, the febrile symptoms soon became aggravated; the skin around the sore, assumed a higher florid color, which shortly became darker, then bluish, and at last black, with a disposition to vesicate; whilst the rest of the limb betrayed a tendency to oedema. All these threatening appearances occurred within twenty four hours; and at this period, the wound, whatever might have been its original shape, soon assumed the circular form. The sore now acquired hard prominent ragged edges, giving it a cupshape appearance, with particular points of the lip of a dishy

yellow hue: while the bottom of the cavity was lined with a flabby, blackish slough. The rapid progress and circular form were highly characteristic of hospital gangrene. The discharge in this second stage became dark colored and fetid, and the pain extremely poignant. The face of the sufferer assumed a ghastly, anxious appearance; his eyes became haggard, and deeply tinged with bile: his tongue loaded with a brown or blackish fur, his appetite entirely failed him, and his pulse was considerably sunk in strength, and perpetually accelerated. The third and last stage was now fast approaching. The surface of the sore was constantly covered with a bloody oozing; and on lifting up the edge of the flabby slough, the probe was tinged with dark colored grumous blood, with which also its track became immediately filled, repeated and copious venous bleedings now came on, at length an artery sprang, which in the attempt to secure it, burst under the ligature. Incessant retchings now came on, and with some, involuntary stools, and hiccup closes the mournful scene."

Now with this observe, by a comparison of these two military authorities that hospital gangrene may either be a local disease: being produced by local contamination of a wound, and

existing for some days before the system at large is affected by it; or it may be constitutional from the first: that is, may be introduced by the absorption of poisonous miasmata into the blood; in which latter case the constitutional symptoms precede the local mischief. In fact, the ordinary constitutional symptoms of hospital gangrene might be induced in the nurses and attendants on the sick, from washing the bandages, and from general exposure to noisome effluvia, without being followed by any local affection whatever.

The indications in the treatment of all the forms of sloughing phagedæna are. 1st. To destroy the diseased surface and its secretions, and 2dly to correct the concomitant contamination of the system.

The first indication is to be effected by means of caustics. The French use the actual cautery: Mr. Blackadder recommends the liquor arsenicalis: but the following mode of using the concentrated nitric acid, as directed by Mr. Welbank is preferable to either. In the first place, the sore must be thoroughly cleansed and all its moisture be absorbed by lint or tow. If the sloughs are very thick, they may be removed by means of forceps and scissars. The surrounding parts must most be defended

with a thick layer of ointment, then a thick pledget of lint, is to be imbued with the acid, and to be pressed steadily on every part of the diseased surface till the latter is converted into a firm, dry, and insensible mass. This application of course causes more or less pain for the moment, but when that subsides, the patient expresses himself free from his previous severer sufferings. The part may be then covered with simple dressings, and cloths wet with cold water. "It is often necessary, always prudent" says Mr. Welbank "to remove the eschar at the end of sixteen or twenty hours; and then, if the patient be free from pain, and the ulcer healthy and florid, it is to be healed with common the mulatinig dressings — such as cerat calamine, or solution of nitrate of silver, or a cerate of turpentine which may be melted and poured in warm." If however there be any recurrence of pain, or the least reappearance of the disease, the acid is again and again to be applied till a healthy action is restored.

If the constitution is not affected, opium may be given to allay the pain caused by the disease, and by the application of the escharotic: the bowels should be opened, and the diet regulated so as to support the strength without exciting

feverishness.

But, observes Hennen, if the disease begin with fever of an inflammatory type, and the patient be robust, and the local infl. intense, a moderate bloodletting may be performed with advantage: with an emetic, purgatives and the anti phlogistic regimen generally. Mercury for the most part is highly pernicious.

If, however, the constitutional affection assume a low or typhoid type, either from the beginning or subsequently, the principal dependence is to be placed on opiates, tonics, and wine, in order to allay irritation and support the strength, keeping the bowels open by cordial laxatives. If there be much diarrhoea, bark will be hurtful.

It is of the utmost importance to prevent the spreading of this dreadful affection by the freest ventilation, by frequent ablution of the bodies of the sick and wounded, and changes of their bed-clothes and linen — by the instant removal of all excrements or filth — and by the most scrupulous care to wash the bandages in boiling water, if they are to be used again, and to destroy them immediately, if they are not. The walls should also be daily whitewashed, and the floor perpetually sprinkled with a solution of the chlorides. All the affected patients should be instantly re

moved to the greatest possible distance from the others: every thing connected with them should be thoroughly cleansed, and the utmost care taken not to convey the contagion by means of sponges or dressings, or even by the fingers or instruments of the surgeon; in fact, tow or lint might wele supersede sponges, as they might be destroyed after using.

Malignant Pustule. is a contagious and very fatal disease common in France, but rare in England, and almost unknown in this country. It commences as a little dark red spot, with a stinging or pricking pain; on which there soon appears a pustule or vesicle seated on a hard inflamed base. When this is opened, it is found to contain a slough, black as charcoal: and the sloughing rapidly spreads, involving skin and cellular tissue, and sometimes the muscles beneath.

The accounts given by the continental writers of this malady are exceedingly various: but it appears certain that it is caused by infection or contagion from horned cattle, which at certain seasons are affected with a precisely similar disease: and it further appears, that like hospital gangrene, it may commence in two ways —

1st. By general infection of the system, from respiring air loaded with miasmata from diseased

animals: or from eating their flesh. In this case it commences with constitutional symptoms: and it is this form which is more particularly styled Charbon.

2ndly. By inoculation of the diseased fluids: and in this case the local symptoms begin before the constitutional. Mr. Lawrence gives an account of a man in Leadenhall Market, who accidentally smeared his face with some stinking hides from South America. The part touched by the putrid matter very soon became red, and hooked, and mortified and the mortification spread over half the cheek. It is believed that flies which have alighted on the ulcers of the diseased animals, convey the virus, and infect other animals, and human beings.

The constitutional symptoms and morbid appearances are those of putrid typhus: the treatment both constitutional and local, such as has been directed for hospital gangrene.

Such, gentlemen, are the most important varieties of ulcers, which I deem it necessary to present to your consideration, for more extended views of the subject, as well as for the many fanciful and curious species invented by pathologists I must take the liberty of referring you to the works these diseases, and with a few closing

I shall proceed to the examination of one of the most eventful of the results of Inflammation viz. Mortification.

You will find that many sores on the lower extremities are accompanied, or rather caused by, a varicose condition of the veins; and by some, a species called the Varicose ulcer: has been added to the general classification. But in truth this term does not express any individual kind, but rather comprehends every variety of sore: for all, or almost all, may be attended by, and partly result from, a varicose condition of the veins. The irritable is very common under such circumstances: so is the inflamed. The indolent and weak, especially the former, are said by some to be the types of the most frequent examples of the varicose ulcer. Occasionally the scrofulous is found complicated with varix: even many have even the sloughing and phagedenic — and in that case profuse venous hemorrhage is to be expected and guarded against. Perhaps the least frequently accompanying is the healthy sore — as can be easily understood, when it is remembered that varix and passive congestion are all but synonymous, and that this state is very unfavorable to all sthenic and healthy vascular action.

The lodgement of foreign matter may complicate the ulcer, effectually preventing cicatrization. This may have come from without, and consist of wood, iron, stone, cloth, &c by impaction originally causing bruise and abscess and then by delaying contraction of the open suppuration, establishing the condition of ulcer. Or it may have an internal origin; consisting of necrosed bone, dead tendon, or ordinary slough of fascia or cellular tissue: the result of suppuration, either then or previously. Of whatever nature, and whencesoever come, the foreign body is always amenable to but one treatment — early and complete removal. Some little excitement may follow the completion of this object, and is to be met by rest, fomentation, poultice, and other usual antiphlogistics: or subsidence, the granulating process begins, and is conducted under the ordinary treatment.

Sometimes ulcers are vicarious in their nature. In females, for example, ulcers may form on the leg, or elsewhere, obviously connected with the menstrual secretion: becoming active, enlarging and emitting a profuse discharge — sometimes sanguinolent — while the menstrual flow is, or should be, in progress; contracting, becoming dull, comparatively dry, and

perhaps partially cicatrizing during the interval. Such sores, it is evident, can be attacked with safety only thro' the uterus. The functions of that organ must in the first instance be duly restored: then, and not until then, our attention is to be directed to the obtaining of cicatrization.

The condition of Fistula or Sinus, may coexist with that of Ulcer, preceding or accompanying. It consists of a narrow channel lined by a pale pseudo-mucous membrane, which may or may not lead to a suppurating cavity. In old cases the parietes of the tube are often dense and semi-cartilaginous.

Fistulae are produced when abscesses are not thoroughly healed from the bottom, when there has been a defect in the bandaging, or in providing proper outlets for the discharge; or when there is some standing cause of irritation, as a ligature, or a piece of dead bone, which keeps up a discharge of pus.

The first indication in the treatment is to remove any source of irritation that may exist. The second to prevent the lodgement of matter, for which purpose it may be perhaps necessary to make another opening. The third indication is to produce adhesion of its walls: to which the mucous lining of the fistula is

naturally indisposed. The means to be adopted are stimulating injections, tents smeared with irritating ointments; the caustic bougie or a seton consisting of a few threads of silk, which may be passed thro' the fistula, and may be gradually diminished as the passage contracts. At the same time, the sides of the fistula should be kept constantly pressed together with compress and bandage. If these means fail, the fistula should be slit up with a bistoury; and then a thin piece of lint be introduced, in order to prevent premature union of the cut edges, and to make it heal from the bottom.

If there have been a succession of small unhealthy abscesses in a part; or if ulceration have spread irregularly in the cellular tissue, so as to leave the skin ragged, and extensively undermined with tortuous sinuses, it will be advisable to destroy the whole of the parts so diseased by the potassa fusa: and this will stimulate the neighbouring sound parts, so that when the slough separates, a healthy surface will be left, which may be healed by the ordinary means.